Appendix 2.1

Maricopa County's
Instructions for Reporting 2002 Annual Air Pollution Emissions

**MARICOPA COUNTY
ENVIRONMENTAL SERVICES**

INSTRUCTIONS

FOR REPORTING 2002

ANNUAL AIR POLLUTION EMISSIONS

January 2003

**Emissions Inventory Unit
1001 North Central Avenue, Suite 250
Phoenix, Arizona 85004
(602) 506-6790
(602) 506-6985 (Fax)**

Copies of this document, related forms
and other reference materials are available online at:
www.maricopa.gov/envsvc/air/ei.asp

TABLE OF CONTENTS

WHAT'S NEW FOR 2002?

- Some **preprinted information** on your report is different from last year. Please review the enclosed forms carefully. If you use your own computerized reproduction of our forms from a previous report, your information must conform to the current information supplied on our 2002 preprinted forms.

- **EPA emission factors for lead** (Pb) are now included for many processes.

- New guidance exists for calculating emissions from **cultured marble and fiberglass processes** that use vapor-suppressed resins. Refer to the "Emissions Inventory Help Sheet for Polyester Resin Application" for further details.

- All **2002 reporting forms are available** at: *www.maricopa.gov/envsvc/air/ei/eiguides.asp* in an editable .pdf format (requires Adobe Acrobat). Data can be entered on these forms and printed to be included in the hard copy submission of this years report.

I. INTRODUCTION

An annual emissions inventory is a formal report submitted by a business that: (1) lists all processes emitting reportable air pollutants and (2) provides details about each of those processes. Submitting the emissions inventory report is *required* as a condition of your Maricopa County Air Quality Permit. A separate emissions report is required for each business location determined by the air quality permit.

Follow these steps to complete your 2002 Maricopa County emissions inventory:

STEP 1: Determine which forms are needed for your business. There are eight different forms available, but not all are required for every type of business. For most permittees, this packet contains the necessary pre-printed forms based on your site's most recent emissions inventory.

1. **Business Form**: Contains general contact information about the firm. This form is required for all businesses.
2. **Stack Form**: Only required if your business location annually emits over 10 tons of any of these single pollutants (CO, VOC, NO_x, PM_{10}, or SO_x). A "stack" is defined as a stack, pipe, vent or opening through which a significant percentage of emissions (from one or more processes) are released into the atmosphere. See the "Stack Form Instructions" on page 7 for specific requirements.
3. **Control Device Form**: Required only if there is one or more emission control devices used at the business location.
4. **General Process Form** and
5. **Evaporative Process Form**:   Either or both will be required for all businesses.
6. **Off-Site Recycling/Disposal Form**: Required if you want to claim off-site recycling or disposal.
7. **Emission Factor Calculations**: Required as attachment for each process for which you calculated your own emission factors.
8. **Data Certification/Fee Calculation Form**: Required for all businesses.

STEP 2: Complete the applicable forms. Detailed information on how to complete the most common forms is included in this document. This packet also contains information about other resources (workshops, one-on-one assistance, etc.) available to help you in completing the necessary forms.

STEP 3: Make a copy of your completed emissions inventory report. Make sure to KEEP COPIES of all forms submitted and copies of all records and calculations used in completing the forms. Air pollution control regulations require that you keep all documentation for at least FIVE YEARS at the location where pollution is being emitted.

STEP 4: Make sure the Data Certification/Fee Calculation Form is *signed* by a company representative. *Include your air quality permit number on all correspondence and checks submitted with your report.* Return the original, signed copy of your annual emission report, with payment for any applicable emission fees, to:

> Maricopa County Environmental Services Dept.
> Emissions Inventory Unit
> 1001 North Central Avenue, Suite 100
> Phoenix, AZ 85004

II. REPORTING REQUIREMENTS

POLLUTANTS TO BE REPORTED:
Your emissions inventory must include your business's emissions of the following air pollutants:

$$CO = \text{Carbon monoxide}$$

CO	=	Carbon monoxide
NO_x	=	Nitrogen oxides
PM_{10}	=	Particulate matter less than 10 microns
SO_x	=	Sulfur oxides
VOC	=	Volatile organic compounds *
HAP&NON	=	Hazardous Air Pollutant (HAP) that is also NOT a precursor of ozone **
NH_x	=	Ammonia & ammonium compounds
Pb	=	Lead

* A ***volatile organic compound (VOC)*** is defined as any compound of carbon that participates in atmospheric photochemical reactions. This definition ***excludes***: carbon monoxide, carbon dioxide, acetone, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, as well as certain other organic compounds. (See Maricopa County Air Pollution Control Rule 100 for a full definition.)

** ***HAP&NON:*** Usage of certain materials that are both a Hazardous Air Pollutant (HAP) and not a precursor of ozone should also be reported if:
(a) your site is subject to a Federal MACT (Maximum Achievable Control Technology) standard ___OR___
(b) your air quality permit contains specific quantitative limits on these materials.

The most common materials in this category include:
- methylene chloride (dichloromethane)
- perchloroethylene
- 111-trichloroethane (111-TCA or methyl chloroform)
- hydrochloric acid
- hydrofluoric acid

VOC materials that are classified as HAPs are reported as ___VOC___.

ASSIGNING IDENTIFICATION NUMBERS (IDs):
Unique IDs are required for the following report elements: Stacks, Control Devices and Processes. For processes, that means a process ID number may be used only once on all General Process and Evaporative Process Forms.

These numbers are usually assigned by the person who prepares the original report. If you are adding something new to a preprinted report, assign a number not already in use. Once an ID number is assigned, continue using the same number for that item from year to year, indefinitely, until it is no longer part of your report. If that item is no longer reportable, return the preprinted form with a brief explanation. Do not use that ID number again.

III. HELPFUL HINTS AND INFORMATION

Be sure to verify all preprinted information on forms. If any information is incorrect or blank, please provide correct information. Making a change on the Business Form will **NOT** transfer the permit ownership or location. You must contact the Department's Business Services Office at (602) 506-6464 to accomplish this.

WHAT IS A PROCESS?   A *process* is a business activity at your location that emits CO, VOC, NO_x, PM_{10}, SO_x, NH_x (ammonia compounds) or HAP&NON (hazardous air pollutants which are not precursors of ozone), and has only *one* material type as input and *one* operating schedule. For each applicable process at your business, you must assign a unique Process ID number to differentiate each process.

PROCESSES AND MATERIALS THAT DO *NOT* HAVE TO BE REPORTED:
- Welding.
- Acetone usage.
- Fuel use for forklifts or other vehicles. (NOTE: Fuel use in *non-vehicle* engines *is* reportable.)
- Storage emissions from fuels or organic chemicals in any tank with a capacity less than 250 gals.
- Storage emissions of diesel and Jet A fuel in underground tanks of any size.
- Storage emissions of diesel and Jet A fuel in aboveground tanks, throughput less than 4,000,000 gal/yr.
- Routine pesticide usage, housekeeping cleaners, and routine maintenance painting at your facility.

Please group all similar equipment and materials together before applying the following limitations:
- Internal combustion engines (e.g., emergency generators) or external combustion equipment (e.g., boilers and heaters) that operated less than 100 hrs. and burned less than 200 gals. diesel or gas, or less than 100,000 cubic feet of natural gas.
- Materials with usage of less than 15 gallons or 100 pounds per year.

GROUPING MATERIALS AND/OR EQUIPMENT UNDER ONE PROCESS ID:
You can group together under one process ID:
- All internal combustion engines *less than 600 horsepower* if they burn the same fuel and have similar operating schedules.
- All external combustion equipment (boilers, heaters) *less than 10,000,000 Btu* per hour if they burn the same fuel and have similar operating schedules.
- All similar evaporative materials with similar emission factors that have similar operating schedules and process descriptions. For example, group low-VOC red paint, green paint and white paint together as one material "Paint: Low-VOC." Do not group thinners with paints. *NOTE*: Attach documentation showing how the grouped emission factor was determined. See the example on page 18.
- All underground tanks with the same fuel and same type of vapor recovery system. *DO NOT* report diesel or Jet A underground tank emissions. *DO NOT* report aboveground diesel or Jet A tank emissions when throughput is less than 4,000,000 gallons annually.

INDUSTRY-SPECIFIC INSTRUCTIONS: Additional help sheets, detailed examples, and special instructions are available for a number of specific processes or industries listed below. To get copies of any of these documents, please visit our Web page at *www.maricopa.gov/envsvc/air/ei.asp* or call (602) 506-6790.

- Bakeries
- Fuel Storage and Handling
- Incinerators and Crematories
- Lg. Aboveground Storage Tanks
- Concrete Batch Plants

- Natural Gas Boilers/Heaters
- Polyester Resin
- Printing Plants
- Roofing Asphalt
- Vehicle Refinishing

- Sand and Gravel Plants
- Using EPA's TANKS 4.09b Program
- Vehicle Travel on Unpaved Roads
- Woodworking

<u>COMMONLY USED CONVERSION FACTORS</u>:

1 gram/liter	= 0.00834 lbs/gal		1 foot	=	0.0001894 mile
1 liter	= 0.2642 gallon US		1 square foot	=	0.000022957 acre
1 therm	= 0.0000952 MMCF		1 pound	=	0.0005 ton

NOTE: MM = 1,000,000   Example: MM CF = 1,000,000 cubic feet
                    M = 1,000   Example: M GAL = 1,000 gallons

<u>CONFIDENTIALITY OF DATA SUBMITTED</u>:

Information submitted in your annual emissions reports must be made available to the public unless it meets certain criteria of Arizona State Statutes and Maricopa County Rules. Applicable excerpts concerning confidentiality of data are reproduced below.

ARS § 49-487 D. ...the following information shall be available to the public:…
     2.   The chemical constituents, concentrations and amounts of any emission of any air contaminant. ...

MARICOPA COUNTY AIR POLLUTION CONTROL RULES AND REGULATIONS, Rule 100:
   200.107   TRADE SECRETS - Information to which all of the following apply:
      a.   A person has taken reasonable measures to protect from disclosure and the person intends to continue to take such measures.
      b.   The information is not, and has not been, reasonably obtainable without the person's consent by other persons, other than governmental bodies, by use of legitimate means, other than discovery based on a showing of special need in a judicial or quasi-judicial proceeding.
      c.   No statute, including ARS §49-487, specifically requires disclosure of the information to the public.
      d.   The person has satisfactorily shown that disclosure of the information is likely to cause substantial harm to the business's competitive position.
   402   CONFIDENTIALITY OF INFORMATION:
   402.2   Any records, reports or information obtained from any person under these rules shall be available to the public ... unless a person:
      a.   Precisely identifies the information in the permit(s), records, or reports which is considered confidential.
      b.   Provides sufficient supporting information to allow the Control Officer to evaluate whether such information satisfies the requirements related to trade secrets as defined in Section 200.107 of this rule.

For emissions inventory information to be kept confidential, the following must be done:
- Specific data which you request be held confidential must be identified by marking an "X" in the corresponding gray confidentiality box(es) on the relevant report forms. Only data in fields with a gray confidentiality box is eligible to be held confidential.
- Provide a written explanation which gives factual information satisfactorily describing why releasing this information could cause substantial harm to the business's competitive position.
- Use the gray-shaded boxes on the reporting forms to indicate which data are to be held confidential. Do NOT stamp "Confidential", highlight data, or otherwise mark the page.
  No data can be held confidential without proper justification.

<u>ADDITIONAL RESOURCES AND ASSISTANCE</u>:

The Maricopa County Emissions Inventory Web page at *www.maricopa.gov/envsvc/air/ei.asp* contains additional reference materials, such as:
- blank copies of most emissions reporting forms.
- this document, "Instructions for Reporting 2002 Annual Air Pollution Emissions".
- an updated list of emission factors for a large number of industrial processes, including SCC codes.
- a list of Tier Codes for industrial processes.
- detailed help sheets for a number of specific industries or processes.

To receive any of the above materials by fax or mail, or for additional information or assistance in how to calculate and report your emissions, please call us at (602) 506-6790.

IV. INSTRUCTIONS FOR COMPLETING COUNTY EMISSIONS INVENTORY FORMS

Business Form Instructions

Verify all preprinted information, and make corrections where necessary. When making corrections, strike out the preprinted data and write in corrections beside it. Please make all changes readily noticeable.

NOTE: Indicating a change in ownership or business location on the Business Form will **_not_** serve to transfer the permit ownership or location. You must contact the Department's Business Services Office at (602) 506-6464 to accomplish this.

Data fields:

6 Number of employees: This should be the annual average number of full-time equivalent (FTE) employee positions.

9 NAICS Code: This 5- or 6-digit North American Industrial Classification System (NAICS) code has been introduced to replace the 4-digit Standard Industrial Classification (SIC) codes. Please list the primary and secondary NAICS codes for your business, if known.

10 Preparer of the Inventory (primary contact for technical questions concerning this report): This should be the person who knows the most about the data in the report. If this person has an e-mail address used for business purposes, please provide it.

Stack Form Instructions

A "stack" is defined as a stack, pipe, vent or opening through which a significant percentage of emissions (from one or more processes) are released into the atmosphere (with or without a control device).

NOTE: Stack information is required only if your business location annually emits over 10 tons of any one of the following pollutants: CO, VOC, NO_x, PM_{10}, or SO_x. If so, you must complete a Stack Form for:
- each stack connected to a control device.
- any stack that discharges annually more than 5 tons of combined pollutant emissions (such as a paint booth exhaust).

EXAMPLE Stack Form Information:

1	2	3	4	5a	5b	6a	6b & 6c	7
Stack ID	Stack Type Code*	Stack Height**	Exit Gas Temperature	Velocity feet/sec	Flow Rate acfm	Diameter inside inch	Length / Width inside inch	Stack Name/Description (Optional)
1	W	30 ft	90 °F		20,000	36		paint booth
2	V	14 ft	200 °F		19,186	40		thermal oxidizer

* Stack Type Codes: **V** = Vertical unobstructed   **H** = Horizontal unobstructed
                                D = Downward unobstructed   **G** = Gooseneck
                                W = Obstructed vertical (e.g. weather cap)

** Stack height is calculated relative to the surrounding terrain. For instance, the stack height of a 10-foot stack on top of a 20-foot tall building is <u>30 feet</u>.

Data fields:

1   <u>Stack ID</u>: (See "<u>Assigning Identification Numbers</u>" on page 3.) A number (up to three digits, numeric only) which identifies a specific stack. It is suggested you start with 1, then 2, etc.

4   <u>Exit Gas Temperature</u>: Should represent average operating conditions.

5a   <u>Exit Gas Velocity</u>: **OR**   5b   <u>Gas Flow Rate</u>:
     Provide **EITHER** the exit velocity (in feet per second) **OR** the flow rate of gas (in actual cubic feet per minute) exiting the stack during normal operations. Preprinted information provides both.

6a   <u>Inside Stack Diameter</u>: For round stacks, provide Inside Stack **Diameter** in inches.
OR
6b & 6c   <u>Inside Stack Length and Width</u>: For square or rectangular stacks, provide inside **Length** <u>and</u> inside **Width** in inches. Preprinted information also provides the calculated diameter of an equivalent circle.

EXAMPLE Control Device Form Information

1	2	3	4	5	6
Control ID	Installation/ Reconstruction* Date	Size or Rated Capacity**	Control Type Code	Control Device Name/Description	Stack ID
1	*05/09/98*	*25,000.0* cfm	*021*	*Thermal oxidizer*	*2*
4	*03/10/97*	cfm	*153*	*Watering with water trucks*	

Data fields:

1 Control ID: (See "Assigning Identification Numbers" on page 3.) A unique number (up to three digits) that you assign to identify a specific control device.

2 Installation/Reconstruction Date: The completion date (given in *mm/dd/yy* format) of installation or the most recent reconstruction of the identified control device. This is not a date on which routine repair or maintenance was done. Reconstruction means any component of the control device was replaced and the cost (fixed capital) of the new component(s) was more than half of what it would have cost to purchase or construct a new control device.

3 Size or Rated Capacity: Report the air or water flow rate in ***cubic feet per minute***. Some devices (e.g., water trucks for dust control) will not include a value in this field.

4 Control Type Code: A 3-digit code designating the type of control device. A complete list of all EPA control device codes can be found on the Web at *http://www.maricopa.gov/envsvc/AIR/EI/eiguides.asp* or call 602-506-6790 for assistance.

6 Stack ID: Not all businesses require a Stack ID. This is required if the Stack Form is required for your site (see page 7) ***and*** the control device has a vent. This is the ID number shown in column 1 of the Stack Form to identify the specific stack that this control device vents to. The Stack ID can be entered on this form after the Stack Form has been filled out.

The General Process Form is used to record data on all emissions-producing processes <u>except</u> evaporative processes. A *general* process is normally characterized by the burning or handling of a material. One form reports all the pollutants for one process. For example, several pollutants are produced by burning fuel, and PM_{10} is emitted by processing rock products, processing materials such as wood or cotton, and driving on unpaved areas.

Data fields: (See sample forms on pages 11 and 12.)
1   <u>Process ID</u>: A number (up to three digits) that is preprinted or you assign. (See "<u>Assigning Identification Numbers</u>" on page 3.) This Process ID number can NOT be used for any other process at this location.

3   <u>Stack ID(s)</u>: The stack ID number(s) shown in column 1 of the Stack Form that identify the stack(s) which vent pollution created by this process. Not all businesses are required to report stacks. This is only required if the Stack Form is required for your site (see page 7) *and* the process has a stack.

4   <u>Process Tier Code</u> and   If these codes are not preprinted on your form, please consult our web
5   <u>SCC Code</u>:   page at *www.maricopa.gov/envsvc/air/ei.asp* or call (602) 506-6790.

6   <u>Seasonal Throughput Percent</u>: Enter the percent of total annual operating time that occurred per season, rounded to the nearest percent. For example, "Dec-Feb _30%_ " means 30% of total annual process activity occurred between December and February. The total for all four seasons must equal 100%.

7   <u>Normal Operating Schedule</u> and   These represent the usual number of hours and time of day
8   <u>Typical Hours of Operation</u>:   when *this process* occurred during the calendar year.

9   <u>Emissions Based on</u>: Provide the *name* of the material used, fuel used, product produced, or whatever was measured for the purpose of calculating emissions, such as "hours of operation," "vehicle miles traveled," or "acres."

10 <u>Used or Produced</u>: Indicate whether calculated emissions are based on a material type *used*, a fuel *used* or a product *produced*. *Leave this field blank* if "hours of operation," "vehicle miles traveled," "acres," or similar unit of measurement is used.

11 <u>Annual Amount</u>: The annual amount (a mathematical number) of material that was used, fuel combusted, product produced, hours of operation, vehicle miles traveled, or acres.

12 <u>Unit of Measure</u>: Units of the material used, fuel used or product produced shown on line 9.
    For example: gallons, pounds, tons, therms, acres, vehicle miles traveled, units produced.

13 <u>Unit Conversion Factor</u>: You must provide this if you use an emission factor with an emission factor unit (see item 16 below) that is *not* the same as the unit of measure (from line 12). This is the standard number you would multiply your amount (line 11) by to convert it to the units of the emission factor. These are some common unit conversion factors:

	Unit Conversion Factor:
– To convert gallons to Mgal. (1,000 gallons)	Multiply by: 0.001
– To convert pounds to tons	Multiply by: 0.0005
– To convert therms to MMCF (million cubic feet) of natural gas	Multiply by: 0.0000952

General Process Form Instructions (continued)

14 <u>Pollutant</u>: See page 3 for a list of pollutants that need to be reported.

15 <u>Emission Factor (EF)</u>: The number to be multiplied by the annual amount (line 11) to determine how much of the pollutant was emitted. If you calculate your own emission factor or change the preprinted emission factor, you must provide details of your calculations on an attachment.

16 <u>Emission Factor (EF) Units</u>: Enter the appropriate Emission Factor Units in pounds (lb) per unit; e.g., lb/ton, lb/MMCF, lb/gal.

17 <u>Controlled Emission Factor (EF)? YES or NO</u>: Indicate "YES" if: 1) you have your own emission factor from testing **and** included the control device efficiency within the factor, or 2) the emission factor used is clearly identified as a controlled emission factor. A "YES" response requires the use of Formula A (see #24 below). Indicate "NO" if: 1) there is no emission control device, or 2) the EF represents emission rates **before** controls. A "NO" response requires the use of Formula B (see #24 below).

18 <u>Calculation Method</u>: Enter the number code (listed at the bottom of the General Process Form) which best describes the method you used to obtain this emission factor. Code 5, "AP-42/FIRE Method or Emission Factor" means that the factor comes from EPA documents or software. *NOTE:* If you have conducted a source test that was required and approved by the County for a specific process or piece of equipment, you *must* use the emission data from that test. Report "4" in this column.

19 through 23: Leave blank if there is no control device.

    19 <u>Capture % Efficiency</u>: The percent of the pollutant that is captured and sent to the primary control device in this process. Be sure to list a capture efficiency separately for *each* pollutant affected.

    20 <u>Primary Control Device ID</u>: If this pollutant is being controlled in this process, enter the Control Device ID number which represents the first control device affecting the pollutant.

    21 <u>Secondary Control Device ID</u>: If this pollutant is being controlled sequentially by 2 devices, enter the Control Device ID number which represents the second control device; otherwise leave this field blank.

    22 <u>Control Device(s) % Efficiency</u>: Enter the total control efficiency of the control device(s). Be sure to list a control device efficiency separately for *each* pollutant affected. If you report a control device efficiency, you must *also* show a capture efficiency in column 19.

    23 <u>Efficiency Reference Code</u>: Enter the code (1 through 7) that best describes how you determined the *control device efficiency*. A list of possible codes is included at the bottom of the form.

24 <u>Estimated Actual Emissions (in pounds/year)</u>: You may round the calculated emissions values to the nearest pound. Calculate as follows:

    A. *Emissions with no controls or controls are reflected in the emission factor*:
       Column 24 = line 11 × line 13 × column 15

    B. *Emissions after control*:
       Column 24 = line 11 × line 13 × column 15 × (1 − [column 19 × column 22])
    Use the decimal equivalent for columns 19 and 22. Example: 96.123% = 0.96123

EXAMPLE: Internal Combustion

Permit number(s) _____ ***999999*** _____

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1- Process ID _____ ***80*** _____

☐ **2-** Process Type/Description: ***3 engines for crushing (each less than 600 HP), diesel @ 0.05% sulfur content***

3- Stack ID(s) *(only if required on Stack Form)* _____ _____ _____ _____ _____

4- Process TIER Code: ***020599*** _____ **FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION**

5- SCC Code ***20200102*** *(8 digit number)* _____ **IND:DIESEL-RECIPROCATING**

6- Seasonal Throughput Percent: Dec-Feb **25** % Mar-May **25** % Jun-Aug **25** % Sep-Nov **25** %

7- Normal Operating Schedule: Hours/Day ***8*** Days/Week **5** Hours/Year ***2080***

8- Typical Hours of Operation: *(military time)* Start ***0700*** End ***1530***

☐ **9-** Emissions based on *(name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled")* ***DIESEL***

10- ☒ Used (input) or ☐ Produced (output)

☐ **11-** Annual Amount: *(a number)* ***16,250***

12- Unit of Measure: *(for example: tons, gallons, million cu ft, acres, units produced, etc.)* ***GALLONS***

13- Unit Conversion Factor *(if needed to convert Unit of Measure to correlate with emission factor units)* ***0.001***

Emission Factor (EF) Information					Control Device Information					
14	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Pollutant	Emission Factor (EF) (number)	Emission Factor Unit (lb per)	Controlled EF? Yes or No	Calculation Method Code*	Capture % Efficiency	Primary Control Device ID	Secondary Control Device ID	Control Device(s) % Efficiency	Efficiency Reference Code**	Estimated Actual Emissions
CO	*130*	*M GALS*	*N*	*5*						*2,113* lbs
NOx	*604*	*M GALS*	*N*	*5*						*9,815* lbs
PM-10	*42.5*	*M GALS*	*N*	*5*						*691* lbs
SOx	*39.7*	*M GALS*	*N*	*5*						*645* lbs
VOC	*49.3*	*M GALS*	*N*	*5*						*801* lbs

* Calculation Method Codes:
  1 = Continuous Emissions Monitoring Measurements
  2 = Best Guess / Engineering Judgment
  3 = Material Balance
  4 = Source Test Measurements (Stack Test)
  5 = AP-42 / FIRE Method or Emission Factor
  6 = State or Local Agency Emission Factor
  7 = Manufacturer Specifications

** Control Efficiency Reference Codes:
  1 = Tested efficiency / EPA reference method
  2 = Tested efficiency / other source test method
  3 = Design value from manufacturer
  4 = Best guess / engineering estimate
  5 = Calculated based on material balance
  6 = Estimated, based on a published value

| **EXAMPLE: Unpaved Road Travel** |

Permit number(s) __999999__

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1- Process ID _____ *28* _____

☐ **2-** Process Type/Description**:** ***UNPAVED ROAD TRAVEL: HEAVY-DUTY TRUCKS @ 15 MPH***

3- Stack ID(s) *(only if required on Stack Form)* _____ _____ _____ _____ _____

4- Process TIER Code: *140799* _____   *MISCELLANEOUS: FUGITIVE DUST*

5- SCC Code *30502504* _____ *(8 digit number)* _____ *SAND/GRAVEL: HAULING*

6- Seasonal Throughput Percent: Dec-Feb *25* % Mar-May *25* % Jun-Aug *25* % Sep-Nov *25* %

7- Normal Operating Schedule: Hours/Day *8* Days/Week *5* Hours/Year *2080*

8- Typical Hours of Operation: *(military time)* Start *0700* End *1530*

☐ **9-** Emissions based on *(name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled")* ***VEHICLE MILES TRAVELED (VMT)***

10- ☐ Used (input)   or   ☐ Produced (output)

☐ **11-** Annual Amount: *(a number)* *7,500*

12- Unit of Measure: *(for example: tons, gallons, million cu ft, acres, units produced, etc.)* __*VMT*__

13- Unit Conversion Factor *(if needed to convert Unit of Measure to correlate with emission factor units)* _____

Emission Factor (EF) Information					Control Device Information					
14	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Pollutant	Emission Factor (EF) (number)	Emission Factor Unit (lb per)	Controlled EF? Yes or No	Calculation Method Code*	Capture % Efficiency	Primary Control Device ID	Secondary Control Device ID	Control Device(s) % Efficiency	Efficiency Reference Code**	Estimated Actual Emissions
PM-10	*3.2*	*VMT*	*N*	*6*	*100*	*4*		*70*	*6*	*7200* lbs
										lbs
										lbs
										lbs
										lbs
										lbs

NOTE: Emissions in col. 24 are calculated as follows: (line 11 × col. 15) × (1 − [col. 19 × col. 22])

* Calculation Method Codes:
 1 = Continuous Emissions Monitoring Measurements
 2 = Best Guess / Engineering Judgment
 3 = Material Balance
 4 = Source Test Measurements (Stack Test)
 5 = AP-42 / FIRE Method or Emission Factor
 6 = State or Local Agency Emission Factor
 7 = Manufacturer Specifications

** Control Efficiency Reference Codes
 1 = Tested efficiency / EPA reference method
 2 = Tested efficiency / other source test method
 3 = Design value from manufacturer
 4 = Best guess / engineering estimate
 5 = Calculated based on material balance
 6 = Estimated, based on a published value

Evaporative Process Form Instructions

The Evaporative Process Form is used to report all emissions produced by evaporation. Examples include: cleaning with solvents, painting and other coatings, printing, using resin, evaporation of fuels from storage tanks, ammonia use, etc. All other processes should be shown on the General Process Form.

One Evaporative Process Form may be used to report numerous materials, with each material given a separate process ID number, as long as the information on lines 1-6 apply to all items on that form. Use a separate form for each group of materials that has a different Process Type/Description (shown on line 1), different Tier Code (line 2) or different operating schedule (lines 3, 4, or 5). Storage tank emissions also must appear on a separate form (see 6 below).

Data fields: (See sample forms on pages 15 and 16.)

1 Process Type/Description: Brief details of the activity in which the listed materials were used.

2 Process Tier Code: If this 6-digit code is not preprinted on your form, please refer to the Tier Code list at *www.maricopa.gov/envsvc/air/ei/eiguides.asp* or call (602) 506-6790.

3 Seasonal Throughput Percent: Enter the percent of total annual operating time that occurred per season (rounded to the nearest percent). For example, "Dec-Feb _30%_ " means 30% of total annual process activity occurred between December and February. The total for all four seasons must equal 100%.

4 Normal Operating Schedule and   These represent the usual number of hours and time of day when
5 Typical Hours of Operation: the emissions reported on *this form* occurred during the year.

6 Storage Tanks: Report emissions from storage of VOC liquids only for tanks larger than 250 gallons. Mark only one category of tank installation, using an additional form per category if needed. "Vaulted" here means the tank is completely enclosed in a building or by thermal insulation. Do NOT include diesel or Jet A tanks with less than 4,000,000 gallons throughput per year. See the "Emissions Inventory Help Sheet for Fuel Storage and Handling" for more specific instructions applicable for fuel tanks up to 15,000 gallons capacity. Bulk plants and terminals should consult the "Help Sheet for Reports Using EPA's TANKS 4.09b Program" or the "Help Sheet for Large Aboveground Storage Tanks."

7 Process ID: A number (up to three digits) that represents this specific material (process). Each process on one form must have the same tier code and operating schedule as that shown in the top portion of the form. This Process ID number can *not* be used for any other process at this business location. See page 3 of these instructions for more explanation of ID numbers and page 4 for exclusions and guidance on grouping materials.

8 Stack ID(s): The stack ID number(s) shown in column 1 of the Stack Form that identify the stack(s) which vent pollution created by this process. Not all businesses are required to report stacks. This is only required if the Stack Form is required for your site (see page 7) *and* the process has a stack.

9 Material Type: Provide the name of the material used in this process. Give the chemical name for pure chemicals or a name that reflects its use (paint, ink, etc.), rather than just a brand name or code number. Examples of materials include: paint, thinner, degreasing solvent (plus its common name), ink, fountain solution, ammonia, alcohol, ETO (ethylene oxide), gasoline (in a storage tank).

10 Annual Material Usage/Input: Amount of this material used during the year. In most cases, the amount purchased is suitable. Write in "lbs" or "gal" (pounds or gallons).

Evaporative Process Form (continued)

11 Pollutant: The only pollutants reported on this form are VOC, HAP&NON and NH$_X$ (see definitions on page 3). When one process (or material) has more than one of these pollutants, list each pollutant on a separate line, using the same process ID number.

12 Emission Factor (EF): An emission factor is a number used to calculate the pounds of pollutant emitted based on the quantity of material used in a process. Emission factors can be obtained from your supplier (usually provided on a Material Safety Data Sheet or environmental data sheet), and must correspond with the material units reported in column 10. If the material unit is "gal," then the emission factor must be in pounds of pollutant per gallon. If the material unit is "lb," then the emission factor must be in pounds of pollutant per pound of material.

Verify (and correct, where necessary) all pre-printed emission factors, as the composition of materials used may have changed since your last report. A "lb/gal" emission factor is almost always less than 8 and never greater than 14. A "lb/lb" emission factor is never larger than 1.0.

13 Pounds of pollutant sent off site: Required only if you wish to take credit for reduced emissions because of waste of this material sent off-site for recycling or disposal. Only waste generated during the report year may be claimed. The Off-Site Recycling/Disposal Form *must* be completed if you wish to claim a credit. The number of pounds reported in column 13 *must* equal the number of pounds reported on the Off-Site Recycling/Disposal Form(s) for the same Process ID number.

14 and 15: Leave these fields blank if there is no control device present.

   14 Capture % Efficiency: The percent of the pollutant from this process that is captured and sent to the control device.

   15 Control ID: If this pollutant is being controlled in this process, enter the Control Device ID number from column 1 of the Control Device Form.

   Control % Efficiency: Enter the percent of this pollutant that is controlled by this control device.

   Code: Select the Control Efficiency Reference Code from the list at the bottom of the form.

16 Estimated Emissions (lbs/yr): Estimated pounds of the pollutant emitted during the year, after off-site recycling/disposal and controls if applicable. **Credit will not be given for off-site recycling/disposal unless it is shown on the Off-Site Recycling/Disposal Form.** Round to the nearest pound. If the answer is 0, give a decimal answer to the first significant digit. Column 16 is calculated as follows:

> *Emissions without off-site recycling/disposal or controls:*
> Column 16 = column 10 × column 12
>
> *Emissions with off-site recycling/disposal:*
> Column 16 = (column 10 × column 12) – column 13
>
> *Emissions with off-site recycling/disposal **and** controls:*
> Column 16 = ([column 10 × column 12] – column 13) × (1 – [column 14 × column 15])

Use the decimal equivalent for columns 14 and 15. Example: 96.123% = 0.96123

EXAMPLE: Coating and Painting

Evaporative Process Form **2002**

Permit number(s) ___*999999*___

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1- Process Type/Description: ___*Coating metal widgets*___

2- Process TIER Code: ___*080415*___   **SOLVENT USE: SURFACE COATING - MISC METAL PARTS**

3- Seasonal Throughput Percent: Dec-Feb __*25*__ %   Mar-May __*25*__ %   Jun-Aug __*25*__ %   Sep-Nov __*25*__ %

4- Normal Operating Schedule: Hours/Day __*8*__   Days/Week __*5*__   Hours/Year __*2080*__

5- Typical Hours of Operation   *(military time)*   Start __*0800*__   End __*1700*__

6- For STORAGE TANKS only. Select only one: ☐ Above Ground Vaulted   ☐ Under Ground   ☐ Above Ground NON-Vaulted

NOTE: Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

7	8	9	10		11*	12		13	14	15			16
Process ID	Stack ID(s)	Material Type	Annual Usage Input	lb or gal	VOC, HAP&NON or NHx	Emission Factor	EF Units (lbs per)	Pounds of pollutant* sent off site	Capture % Efficiency	Control ID	Control % Efficiency	Control Efficiency Code**	Estimated Emissions (lbs/yr)
800	*1*	*lacquer*	*95*	*gl*	*VOC*	*4.7*	*lb/gal*		%		%		*447*
801	*1*	*lacq thinner*	*120*	*gl*	*VOC*	*7.1*	*lb/gal*		%		%		*852*
802	*1*	*paint*	*940*	*gl*	*VOC*	*4.2*	*lb/gal*		%		%		*3,948*
803	*1*	*pnt thinner*	*707*	*gl*	*VOC*	*7.0*	*lb/gal*		%		%		*4,949*
804	*1*	*powder paint*	*20,200*	*lb*	*VOC*	*.001*	*lb/lb*		%		%		*20*
									%		%		

Note: Do NOT change pre-printed Process ID numbers. See the instructions for information on how to delete materials that are no longer used, or to assign Process ID numbers for new materials.

* If you have off-site recycling/disposal of any of the materials listed above, you must complete an Off-site Recycling/Disposal Form to receive credit for reduced emissions.

> *NOTE: Emissions in col. 16 are calculated as follows: ([col. 10 × col. 12] – col. 13) × (1 – [col. 14 × col. 15])*

** Control Efficiency Reference Codes

1 = Tested efficiency / EPA reference method   **2** = Tested efficiency / other source test method   **3** = Design value from manufacturer
4 = Best guess / engineering estimate   **5** = Calculated based on material balance   **6** = Estimated, based on a published value.

EXAMPLE: Cleaning solvent (with recycling)

Evaporative Process Form 2002

Permit number(s) __*999999*__

☐ **1-** Process Type/Description: __*Cleaning metal parts*__

2- Process TIER Code: __*080103*__   SOLVENT USE: DEGREASING - COLD CLEANING

3- Seasonal Throughput Percent: Dec-Feb __*25*__ %   Mar-May __*25*__ %   Jun-Aug __*25*__ %   Sep-Nov __*25*__ %

4- Normal Operating Schedule: Hours/Day __*4*__   Days/Week __*5*__   Hours/Year __*1040*__

5- Typical Hours of Operation *(military time)*   Start __*1300*__   End __*1700*__

6- For STORAGE TANKS only. Select only one: ☐ Above Ground Vaulted   ☐ Under Ground   ☐ Above Ground NON-Vaulted

NOTE: Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

7	8	9	10		11*	12		13	14	15			16
Process ID	Stack ID(s)	Material Type	Annual Usage Input	lb or gal	VOC, HAP&NON or NHx	Emission Factor	EF Units (lbs per)	Pounds of pollutant* sent off site	Capture % Efficiency	Control ID	Control % Efficiency	Control Efficiency Code**	Estimated Emissions (lbs/yr)
3	*2*	*sanitizer*	*716*	*lb*	*VOC*	*1.0*	*lb*		*95* %	*1*	*80* %	*3*	*172*
6		*gun cleaner*	*180*	*gl*	*VOC*	*7.2*	*gl*	*448*	%		%		*848*
7		*xyz stripper*	*1300*	*gl*	*VOC*	*3.3*	*gl*	*3,237*	%		%		*1,053*
8		*cleaning solvents*	*358*	*gl*	*VOC*	*6.4*	*gl*	*892*	%		%		*1,399*
9		*generoclean*	*2258*	*gl*	*VOC*	*6.8*	*gl*	*5,623*	%		%		*9,731*
									%		%		

Note: Do NOT change pre-printed Process ID numbers. See the instructions for information on how to delete materials that are no longer used, or to assign Process ID numbers for new materials.

* If you have off-site recycling/disposal of any of the materials listed above, you must complete an Off-site Recycling/Disposal Form to receive credit for reduced emissions.

NOTE: This example shows the case where 2,400 of the original 4,096 gallons of materials #6 through 9 were captured for off-site recycling, and the pollutant content of the waste material was estimated to be 75% of the original. The pounds of pollutant sent off-site shown in column 13 is calculated on the example Off-Site Recycling/Disposal Form on the next page.

Off-Site Recycling/Disposal Form 2002

Permit number(s) ___*999999*___

> **NOTE:** If you need blank copies of this form, call the Emissions Inventory Unit at (602) 506-6790 or consult our web page at *www.maricopa.gov/envsvc/air/ei.asp.* If any waste streams contain a significant amount of solid material (recorded in pounds), contact the Emissions Inventory Unit for assistance in how to report these materials.

Provide one copy of this form for each <u>waste stream</u> at your business location. Make copies of this page as needed.

A waste stream is the liquid waste from one or more processes mixed together to make one liquid waste product before it is taken off site for recycling, disposal or combustion.

1) Assign a unique one or two-digit ID number to identify the waste stream that will be described below. ___*01*___
   (Start with ID# 1 for first waste stream, then use 2 for second, etc.)

2) How many gallons of liquid waste did this waste stream produce in 2002? ___*2,400*___ gallons.
   Keep waste disposal company manifests as proof that this amount of liquid waste was taken off-site.

3) What was the **average** pollutant content of the liquid waste stream?

   VOC ___*4.25*___ lbs/gal   HAP&NON _____ lbs/gal   NHx _____ lbs/gal

> **NOTE:** Liquid waste normally has less pollutant content than the new product. Some of the pollutant evaporates during the use of the product, and there is usually dirt, water and/or other contaminants in the liquid waste. The estimated pollutant content of the liquid waste is usually between 50% and 95% of the new product. This example estimates an average VOC content (reported on line 3) to be 75% of the original VOC content of 5.67 lbs/gal., to account for evaporation and contaminants. See the example on page 18 to calculate a weighted average.

4) Calculate the total annual pollutant content of the liquid waste in this waste stream.
   (volume of liquid waste, from line 2) × (pollutant content, from line 3) = Total pollutants in waste stream, in lbs/yr.

   VOC ___*10,200*___ lbs/yr   HAP&NON _____ lbs/yr   NHx _____ lbs/yr

5) List the process ID numbers of the processes contributing to this waste stream. Also estimate the pounds of pollutant that each process contributed to this waste stream.

NOTE: Column totals in the table below must equal the total for each pollutant type reported on line 4. The quantities you report below for each pollutant and process must also be reported in column 13 on the Evaporative Process Form.

Process ID		Annual VOC (lbs)		Annual HAP&NON (lbs)		Annual NHx (lbs)	
6	Contributed about	*448*	lbs		lbs		lbs
7	Contributed about	*3,237*	lbs		lbs		lbs
8	Contributed about	*892*	lbs		lbs		lbs
9	Contributed about	*5,623*	lbs		lbs		lbs
	Contributed about		lbs		lbs		lbs
	Contributed about		lbs		lbs		lbs
	Contributed about		lbs		lbs		lbs

EXAMPLE: Documentation of Emission Factor Calculations

Identify the process ID(s) and pollutant(s). Show calculations made to obtain the emission factors used for the process(es). Include references to data sources used, including the document name, date published, page numbers, etc.

Emission Factor Calculation

Process ID _____ *201* _____   Permit number _____ *999999* _____

Emission factors derived from source test performed 6/12/97 by XYZ Engineering Company (copy of summary tables also attached).

Outlet (after controls):

CO = 0.43 lb/hr × 1 hr/60 min × 1 min/77.9 cu. ft × 1,000,000 cu. ft/MMCF
*   = 92.0 lb/MMCF*

NOx = 0.09 lb/hr × 1 hr/60 min × 1 min/77.9 cu. ft × 1,000,000 cu. ft/MMCF
*   = 19.3 lb/MMCF*

NOTE: The example below shows how the weighted average of the materials going into the waste stream is calculated. A weighted-average emission factor has been calculated by listing usage amounts and emission factors for each material, summing each column, and then dividing the total emissions by the total gallons used.

In this example: 23,232 lbs ÷ 4,096 gal = 5.67 lb/gal average VOC content. This emission factor is then used to calculate the average pollutant content in the Off-site Recycling / Disposal Form example.

This process can also be used to find the weighted average emission factor for similar materials if you are reporting them together as a single line item on the Evaporative Process form. Refer to the explanation of grouping on page 4.

Process ID _____ *8* _____

Material Type	2002 Usage	Units	VOC (lbs/unit)	VOC Emissions (= Usage × VOC content)
gun cleaner	*180*	*gal*	*7.2*	*1,296 lbs.*
xyz stripper	*1,300*	*gal*	*3.3*	*4,290*
cleaning solvent	*358*	*gal*	*6.4*	*2,291*
generoclean solvent	*2,258*	*gal*	*6.8*	*15,354*
Totals:	*4,096*	*gal*		*23,231 lbs.*

Average VOC content:	*23,231 lbs.*	*=*	*5.67*
	4,096 gals		*lb/gal*

Calculating an emission fee:

– If your total emissions on line 6 of the Data Certification/Fee Calculation Form are less than 10,000 lbs., you have no emission fee to pay.

– If your total emissions from line 6 are 10,000 lbs. or more, divide the total emissions by 2000 to convert pounds into tons of VOC. **Round to the nearest ton.** Multiply this number by $38.69 to calculate your emission fee.

The table below summarizes annual emission fees for reports up to 25 tons:

If your annual emissions total in POUNDS is:	Your annual total in TONS is:	Your 2002 emissions fee is:
Less than 10,000 lbs.		**$0.00**
between 10,000 – 10,999.9 lbs.	5	$193.45
between 11,000 – 12,999.9 lbs.	6	$232.14
between 13,000 – 14,999.9 lbs.	7	$270.83
between 15,000 – 16,999.9 lbs.	8	$309.52
between 17,000 – 18,999.9 lbs.	9	$348.21
between 19,000 – 20,999.9 lbs.	10	$386.90
between 21,000 – 22,999.9 lbs.	11	$425.59
between 23,000 – 24,999.9 lbs.	12	$464.28
between 25,000 – 26,999.9 lbs.	13	$502.97
between 27,000 – 28,999.9 lbs.	14	$541.66
between 29,000 – 30,999.9 lbs.	15	$580.35
between 31,000 – 32,999.9 lbs.	16	$619.04
between 33,000 – 34,999.9 lbs.	17	$657.73
between 35,000 – 36,999.9 lbs.	18	$696.42
between 37,000 – 38,999.9 lbs.	19	$735.11
between 39,000 – 40,999.9 lbs.	20	$773.80
between 41,000 – 42,999.9 lbs.	21	$812.49
between 43,000 – 44,999.9 lbs.	22	$851.18
between 45,000 – 46,999.9 lbs.	23	$889.87
between 47,000 – 48,999.9 lbs.	24	$928.56
between 49,000 – 50,999.9 lbs.	25	$967.25

<div align="center">

EXAMPLE

</div>

Data Certification/Fee Calculation Form **2002**   Permit number   *999999*

For EACH pollutant listed, total up all emissions recorded on your General Process and Evaporative Process Forms. Enter these numbers in column 1, "Totals from Process Forms." Report any emissions from accidental releases in column 2.
Add the figures in each row across, and enter the result in column 3, "Total Emissions".
Carefully follow the instructions on lines 6 through 8 to calculate any emission fee owed.

NOTE: "Accidental Releases" reported in column 2 should include all excess emissions
       reported to the Department under Rule 140, Section 500.

Summary of 2002 Annual Emissions:	(1) Totals from Process Forms	(2) + Accidental Releases	(3) = TOTAL 2002 Emissions
CO	*2,113*	*0*	*2,113*
NH$_x$		*0*	
Lead		*0*	

Emissions fees are based on your emissions of the following pollutants ONLY:

		(1)	(2)	(3)
1	HAP&NON		*0*	
2	VOC	*24,220*	*0*	*24,220*
3	NO$_x$	*9,815*	*0*	*9,815*
4	SO$_x$	*645*	*0*	*645*
5	PM$_{10}$	*7,891*	*0*	*7,891*
6	**Add "TOTAL" column from lines 1 through 5 ONLY:**			*42,571* lbs.
7	If line 6 is less than 10,000 pounds, no emission fee is due. Enter zero (0) on line 8. If line 6 is 10,000 pounds or more, divide line 6 by 2000 (pounds per ton) to get tons, and round the number to the nearest ton. (Drop any decimal .499 or less. Increase to the next whole number any decimal of .500 or more.) Enter the resulting WHOLE NUMBER here.			*21* TONS
8	Multiply line 7 (a WHOLE number) by **$ 38.69**. This is your **2002 ANNUAL EMISSIONS FEE**. **NOTE:** If your total annual emissions are less than 10,000 lbs., no emissions fee is due.		$	*799.68*

NOTE: Review specific requirements for data confidentiality on page 5. We cannot hold
       any data confidential without the required documentation.

TO COMPLETE YOUR EMISSIONS INVENTORY REPORT:
- If your annual emissions are 10,000 lbs. or more, include a check (made payable to Maricopa County Environmental Services) for the amount calculated on line 8 above.
- Complete the Confidentiality Statement below.
- Sign and date this form below where indicated.
- Send the **original** copy of your completed forms, along with any emission fee due to: Maricopa County Environmental Services Dept., Emissions Inventory Unit, 1001 No. Central Ave., Suite 100, Phoenix, AZ 85004. Keep a copy of all forms for your records.

CONFIDENTIALITY STATEMENT:
This annual emissions report contains requests to keep some data confidential.   ☐ YES   ☒ NO
If you check "YES", you must submit documentation and meet certain requirements before your data can be deemed confidential.
See enclosed instructions for further details.

NOTE: The Data Certification form must be signed by a responsible company official.

CERTIFICATION STATEMENT:
I declare under penalty of perjury that the data (e.g. inputs, emission factors, controls, and annual emissions) presented herein represents the best available information and is true, accurate and complete to the best of my knowledge.

_____

Signature of owner/business officer   Date of signature   Telephone number

_____

Type or print full name of owner/business officer   Type or print full title

Appendix 3.1

2002 Fire Department Survey Results

Fire Department	Structure Fires	Vehicle Fires	Brush Fires	Approx. Acreage (per fire)	Boat Fires	Total acreage [6]
Aguila Fire District	0	2	21	< 1 acre		2.1
Avondale Fire Department	83	104	42	unknown		4.2
AZ Bureau of Land Management		0	12	9.5 acres total		9.5
AZ State Land Dept.		2	35	115.75 total		115.8
Buckeye Fire Dept. [5]	41	44	73			7.3
Buckeye Valley Rural Fire District	26	32	45	1		45.0
Chandler Fire Department	62	59	103	unknown		10.3
Circle City-Morristown Fire District [1]						
City of Phoenix Fire Department	1,754	3,338	4,323	unknown		432.3
Daisy Mountain Fire District	4	28	17	10		170.0
El Mirage Fire Department	6	6	20	0		2.0
Gila Bend Fire Department	15	18	55	0		5.5
Gilbert Fire Department	48	58	130	unknown		13.0
Glendale Fire Department	113	159	70	N/A		7.0
Goodyear Fire Department	17	43	28	0		2.8
Guadalupe Fire Department [2]	18	26	60			6.0
Harquahala Valley Fire District	8	30	70	400 acres total		400.0
Laveen Fire Department [3]	31	42	89			8.9
Luke AFB Fire Alarm Comm. Ctr.	10	9	0			0.0
Mesa Fire Department	271	439	623	N/A		62.3
Peoria Fire Department	70	129	183	unknown		18.3
Pleasant Harbor Marina	0	0	3	5	4	15.0
Rural Metro: West and East Valley [4]	701	401	476			47.6
Sun City Fire District	51	7	24	3		72.0
Sun City West Fire Department	21	16	4			0.4
Sun Lakes Fire District	1	1	1			0.1
Surprise Fire Department	19	40	60	<1		6.0
Tempe Fire Dept	114	180	309	N/A		30.9
Tolleson Fire Department	87	50	76	2		152.0
Wickenburg Fire Dept.	12	30	60	0.5-1		6.0
Wickenburg Volunteer Fire Dept.						
Wittman Volunteer Fire Dept.	14	19	42	< 1		4.2
TOTAL	**3,597**	**5,312**	**7,054**		**4**	**1,656.5**

Notes:

[1] Survey data not available in 1996 or 1999, so fire data was not substituted.

[2] No 2002 data reported, pre-1996 data used.

[3] Laveen fire department reported 162 total number of fire calls in 2002; 1999 percentages were used to allocate 2002 numbers as follows: 19% structure; 26% auto; 55% brush.

[4] 1999 data was used for Rural Metro because no survey was returned from Rural Metro West Valley and Rural Metro East Valley only reported 156 structure fires and 27 brush fires in 2002

[5] Brush fires include outside rubbish and equipment fires.

[6] When acreage was not provided or data was incomplete or unclear, assumed each reported brush fire was equal to 0.1 acres.

Appendix 5.1

Traffic Information

URBANIZED AREA NAME	POPULATION (1,000)	NET LAND AREA (SQ MILES)	DATA TYPE	FUNCTIONAL SYSTEM						
				PRINCIPAL ARTERIALS			MINOR ARTERIAL	COLLECTOR	LOCAL	TOTAL
				INTERSTATE	OTHER FREEWAYS & EXPRESSWAYS	OTHER				
PHOENIX	2,949	1,054	LENGTH	53	136	601	599	662	8,633	10,684
			TRAVEL (1,000)	8,998	13,530	17,890	10,309	5,636	6,975	63,338
TUCSON	709	312	LENGTH	20	15	172	309	195	2,384	3,095
			TRAVEL (1,000)	1,828	532	5,354	4,310	864	1,681	14,569
YUMA	88	34	LENGTH	4	-	22	24	19	249	318
			TRAVEL (1,000)	76	-	460	274	109	176	1,095
FLAGSTAFF	67	73	LENGTH	17	-	12	26	45	177	277
			TRAVEL (1,000)	468	-	298	151	153	132	1,202
			LENGTH							-
			TRAVEL (1,000)							-
TOTAL	3,813	1,473	LENGTH	94	151	807	958	921	11,443	14,374
			TRAVEL (1,000)	11,370	14,062	24,002	15,044	6,762	8,964	80,204

Units for defining length and travel in this report are miles and vehicle-miles (in thousands), respectively
Figures shown originally submitted to Federal Highway Administration in October, 2003
Figures may not add up to totals due to numerical rounding

DONUT AREA NAME	POPULATION (1,000)	NET LAND AREA (SQ MILES)	DATA TYPE	FUNCTIONAL SYSTEM						
				ARTERIALS			COLLECTORS			
				INTERSTATE / URBAN FRWY	OTHER PRINCIPAL	MINOR	RURAL MAJ / MIN	URBAN	LOCAL	TOTAL
PHOENIX	2,949	1,054	LENGTH	39	83	84	443	196	2,371	3,216
			TRAVEL (1,000)	1,830	972	965	1,753	631	543	6,694
TUCSON	709	312	LENGTH	37	17	21	257		1	333
			TRAVEL (1,000)	1,524	160	243	705		16	2,648
			LENGTH		-					-
			TRAVEL (1,000)		-					-
			LENGTH		-					-
			TRAVEL (1,000)		-					-
			LENGTH							-
			TRAVEL (1,000)							-
TOTAL	3,658	1,366	LENGTH	76	100	105	700	196	2,372	3,549
			TRAVEL (1,000)	3,354	1,132	1,208	2,458	631	559	9,342

Units for defining length and travel in this report are miles and vehicle-miles (in thousands), respectively
Figures shown originally submitted to Federal Highway Administration in August, 2000
Figures may not add up to totals due to numerical rounding

FHWA HIGHWAY FUNCTIONAL SYSTEM

RURAL			URBAN		
Code	Description	Estimated DVMT (In Thousands)	Code	Description	Estimated DVMT (In Thousands)
1	Principal Arterial - Interstate	2,876	11	Principal Arterial - Interstate	9,927
2	Principal Arterial - Other	1,641	12	Freeways & Expressways	13,801
6	Minor Arterial	769	14	Principal Arterial - Other	17,518
7	Major Collector	2,236	16	Minor Arterial	10,452
8	Minor Collector	255	17	Collector	6,241
9	Local	511	19	Local	7,352
	County Rural Total:	8,288		**County Urban Total:**	65,291

Total Estimated County DVMT: (In Thousands)   73,579

Units for defining length and travel in this report are miles and vehicle-miles (in thousands), respectively

Figures shown originally submitted to Federal Highway Administration in October, 2003

Figures may not add up to totals due to numercial rounding

Appendix 5.2

MOBILE6.2 Inputs, Outputs, and Spreadsheet

In order to calculate vehicle emission factors for the 2002 peak carbon monoxide season, two MOBILE6.2 runs were performed:

    1.   I/M program in place.

    2.   No I/M program in place.

A portion of the MOBILE6.2 input and output files are provided in this appendix as an example. Scenarios for each Area and Facility type combination were defined within each input file. The MOBILE6.2 emission factors produced by the two runs were subsequently weighted together in a spreadsheet program using the appropriate proportions as described in the Emission Factor Estimation Procedure section. The spreadsheet calculations are included after the MOBILE6.2 input and output files in this appendix.

In order to calculate annual average day emission factors for 2002, twenty four MOBILE6.2 runs were performed:

    1.   I/M program in place, and

    2.   No I/M program in place,

for all twelve months of the year for a total of 24 runs.

Scenarios for each Area and Facility type combination were defined within each input file. The MOBILE6.2 emission factors produced by the runs were subsequently weighted together using the FORTRAN program "NEIProgram" using the appropriate proportions as described in the Emission Factor Estimation Procedure section.

MOBILE6 INPUT FILE :
POLLUTANTS   : CO

RUN DATA
NO REFUELING   :
I/M PROGRAM   : 1 1977 2050 1 T/O LOADED/IDLE
I/M MODEL YEARS   : 1 1967 2050
I/M VEHICLES   : 1 11111 22222222 2
I/M STRINGENCY   : 1 28.0
I/M COMPLIANCE   : 1 97.0
I/M WAIVER RATES   : 1 1.3 1.0
I/M GRACE PERIOD   : 1 5
I/M PROGRAM   : 2 1977 2050 2 T/O IM240
I/M MODEL YEARS   : 2 1981 1995
I/M VEHICLES   : 2 22222 11111111 1
I/M STRINGENCY   : 2 28.0
I/M COMPLIANCE   : 2 97.0
I/M WAIVER RATES   : 2 1.3 1.0
I/M GRACE PERIOD   : 2 5
I/M CUTPOINTS   : 2 CUTcmp03.d
I/M PROGRAM   : 3 1977 2050 1 T/O LOADED/IDLE
I/M MODEL YEARS   : 3 1967 1980
I/M VEHICLES   : 3 22222 11111111 1
I/M STRINGENCY   : 3 28.0
I/M COMPLIANCE   : 3 97.0
I/M WAIVER RATES   : 3 1.3 1.0
I/M PROGRAM   : 4 2001 2050 2 T/O OBD I/M
I/M MODEL YEARS   : 4 1996 2050
I/M VEHICLES   : 4 22222 11111111 1
I/M STRINGENCY   : 4 28.0
I/M COMPLIANCE   : 4 97.0
I/M WAIVER RATES   : 4 1.3 1.0
I/M GRACE PERIOD   : 4 5
I/M PROGRAM   : 5 2001 2050 2 T/O EVAP OBD & GC
I/M MODEL YEARS   : 5 1996 2050
I/M VEHICLES   : 5 22222 11111111 1
I/M STRINGENCY   : 5 28.0
I/M COMPLIANCE   : 5 97.0
I/M WAIVER RATES   : 5 1.3 1.0
I/M GRACE PERIOD   : 5 5

ANTI-TAMP PROG   :
87 75 80 22222 22222222 2 11 097. 22111222
ANTI-TAMP PROG   :
87 81 95 11111 22222222 2 11 097. 22111222

*the tech12.d file must be located with Mobile6 execution file
*the user tech file tech12.1me should be renamed as tech12.d
*Two more I/M programs should not have overlapped motor vehicles.

REG DIST   : 02reg03.d
DIESEL FRACTIONS :
0.0050 0.0050 0.0040 0.0060 0.0040 0.0040 0.0030 0.0030 0.0030 0.0030
0.0030 0.0040 0.0040 0.0030 0.0030 0.0040 0.0080 0.0090 0.0160 0.0210
0.0430 0.0580 0.0470 0.0480 0.0260
0.0740 0.0740 0.0660 0.0690 0.1030 0.0280 0.0600 0.0500 0.0390 0.0250
0.0400 0.0330 0.0280 0.0250 0.0170 0.0150 0.0220 0.0290 0.0330 0.0480
0.0550 0.0720 0.0350 0.0290 0.0170
0.0740 0.0740 0.0660 0.0690 0.1030 0.0280 0.0600 0.0500 0.0390 0.0250
0.0400 0.0330 0.0280 0.0250 0.0170 0.0150 0.0220 0.0290 0.0330 0.0480
0.0550 0.0720 0.0350 0.0290 0.0170
0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0115 0.0111
0.0145 0.0115 0.0129 0.0096 0.0083 0.0072 0.0082 0.0124 0.0135 0.0169
0.0209 0.0256 0.0013 0.0006 0.0011
0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0115 0.0111
0.0145 0.0115 0.0129 0.0096 0.0083 0.0072 0.0082 0.0124 0.0135 0.0169
0.0209 0.0256 0.0013 0.0006 0.0011
0.1998 0.1998 0.1998 0.1998 0.1998 0.1998 0.1998 0.1998 0.2578 0.2515
0.3263 0.2784 0.2963 0.2384 0.2058 0.1756 0.1958 0.2726 0.2743 0.3004
0.2918 0.2859 0.0138 0.0000 0.0000
0.6774 0.6774 0.6774 0.6774 0.6774 0.6774 0.6774 0.6774 0.7715 0.7910
0.8105 0.8068 0.8280 0.8477 0.7940 0.7488 0.7789 0.7842 0.6145 0.5139
0.5032 0.4277 0.0079 0.0000 0.0000
0.8606 0.8606 0.8606 0.8606 0.8606 0.8606 0.8606 0.8606 0.8473 0.8048
0.8331 0.7901 0.7316 0.7275 0.7158 0.5647 0.3178 0.2207 0.1968 0.1570
0.0738 0.0341 0.0414 0.0003 0.0000
0.4647 0.4647 0.4647 0.4647 0.4647 0.4647 0.4647 0.4647 0.4384 0.3670
0.4125 0.3462 0.2771 0.2730 0.2616 0.1543 0.0615 0.0383 0.0333 0.0255
0.0111 0.0049 0.0060 0.0000 0.0000
0.6300 0.6300 0.6300 0.6300 0.6300 0.6300 0.6300 0.6300 0.6078 0.5246
0.5767 0.5289 0.5788 0.5617 0.4537 0.4216 0.4734 0.4705 0.4525 0.4310
0.3569 0.3690 0.4413 0.3094 0.1679

```
0.8563 0.8563 0.8563 0.8563 0.8563 0.8563 0.8563 0.8563 0.8443 0.7943
0.8266 0.7972 0.8279 0.8177 0.7440 0.7184 0.7588 0.7567 0.7431 0.7261
0.6602 0.6717 0.7344 0.6107 0.4140
0.9992 0.9992 0.9992 0.9992 0.9992 0.9992 0.9992 0.9992 0.9989 0.9987
0.9989 0.9977 0.9984 0.9982 0.9979 0.9969 0.9978 0.9980 0.9979 0.9976
0.9969 0.9978 0.9982 0.9974 0.9965
1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000 1.0000 1.0000 1.0000 1.0000
0.9585 0.9585 0.9585 0.9585 0.9585 0.9585 0.9585 0.9585 0.8857 0.8525
0.8795 0.9900 0.9105 0.8760 0.7710 0.7502 0.7345 0.6733 0.5155 0.3845
0.3238 0.3260 0.2639 0.0594 0.0460
```

SCENARIO RECORD   : AT1 Int/Free
CALENDAR YEAR   : 2003
EVALUATION MONTH   : 1
ALTITUDE   : 1
MIN/MAX TEMPERATURE: 45.0 73.
AVERAGE SPEED   : 59.7 freeway
VMT BY FACILITY   : allfwy.def
FUEL RVP   : 8.5
FUEL PROGRAM   : 4
 45.6 45.6 45.6 45.6 45.6 45.6 45.6 45.6
 45.6 45.6 45.6 45.6 45.6 45.6 45.6 45.6
 338.0 338.0 338.0 338.0 338.0 338.0 338.0 338.0
 338.0 338.0 338.0 338.0 338.0 338.0 338.0 338.0
OXYGENATED FUELS   : 0.000 1.000 0.000 0.031 1

SCENARIO RECORD   : AT2 Int/Free
CALENDAR YEAR   : 2003
EVALUATION MONTH   : 1
ALTITUDE   : 1
MIN/MAX TEMPERATURE: 45.0 73.
AVERAGE SPEED   : 60.3 freeway
VMT BY FACILITY   : allfwy.def
FUEL RVP   : 8.5
FUEL PROGRAM   : 4
 45.6 45.6 45.6 45.6 45.6 45.6 45.6 45.6
 45.6 45.6 45.6 45.6 45.6 45.6 45.6 45.6
 338.0 338.0 338.0 338.0 338.0 338.0 338.0 338.0
 338.0 338.0 338.0 338.0 338.0 338.0 338.0 338.0
OXYGENATED FUELS   : 0.000 1.000 0.000 0.031 1

SCENARIO RECORD   : AT3 Int/Free
CALENDAR YEAR   : 2003
EVALUATION MONTH   : 1
ALTITUDE   : 1
MIN/MAX TEMPERATURE: 45.0 73.
AVERAGE SPEED   : 63.2 freeway
VMT BY FACILITY   : allfwy.def
FUEL RVP   : 8.5
FUEL PROGRAM   : 4
 45.6 45.6 45.6 45.6 45.6 45.6 45.6 45.6
 45.6 45.6 45.6 45.6 45.6 45.6 45.6 45.6
 338.0 338.0 338.0 338.0 338.0 338.0 338.0 338.0
 338.0 338.0 338.0 338.0 338.0 338.0 338.0 338.0
OXYGENATED FUELS   : 0.000 1.000 0.000 0.031 1

SCENARIO RECORD   : AT4 Int/Free
CALENDAR YEAR   : 2003
EVALUATION MONTH   : 1
ALTITUDE   : 1
MIN/MAX TEMPERATURE: 45.0 73.
AVERAGE SPEED   : 64.8 freeway
VMT BY FACILITY   : allfwy.def

```
***********************************************************************
* MOBILE6.2.03 (24-Sep-2003)                    *
* Input file: IMDEC02.IN (file 1, run 1).       *
***********************************************************************
  M603 Comment:
        User has disabled the calculation of REFUELING emissions.


* Reading non-default I/M CUTPOINTS from the following external
* data file: CUTCMP03.D

* Reading Registration Distributions from the following external
* data file: 02REG03.D

  M614 Comment:
        User supplied diesel sale fractions.

* # # # # # # # # # # # # # # # # # # # # # # # #
* AT1 Int/Free
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # #
  M582 Warning:
        The user supplied freeway average speed of 59.7
        will be used for all hours of the day. 100% of VMT
        has been assigned to a fixed combination of freeways
        and freeway ramps for all hours of the day and all
         vehicle types.


* Reading Hourly Roadway VMT distribution from the following external
* data file: ALLFWY.DEF

  Reading User Supplied ROADWAY VMT Factors
  M616 Comment:
         User has supplied post-1999 sulfur levels.
*** I/M credits for Tech1&2 vehicles were read from the following external
   data file: TECH12.D
  M 48 Warning:
        there are no sales for vehicle class HDGV8b

              Calendar Year:  2003
                     Month:  Jan.
                   Altitude:  Low
       Minimum Temperature:  45.0 (F)
       Maximum Temperature:  73.0 (F)
         Absolute Humidity:  75. grains/lb
          Nominal Fuel RVP:  8.5 psi
            Weathered RVP:  8.5 psi
        Fuel Sulfur Content:  46. ppm

        Exhaust I/M Program:  Yes
           Evap I/M Program:  Yes
               ATP Program:  Yes
            Reformulated Gas:  No

  Ether Blend Market Share: 0.000     Alcohol Blend Market Share: 1.000
  Ether Blend Oxygen Content: 0.000    Alcohol Blend Oxygen Content: 0.031
                      Alcohol Blend RVP Waiver: No

   Vehicle Type:    LDGV   LDGT12  LDGT34   LDGT   HDGV    LDDV    LDDT   HDDV    MC   All Veh
         GVWR:            <6000   >6000   (All)
           ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
  VMT Distribution:  0.4421  0.2866  0.1136          0.0356  0.0022  0.0229  0.0919  0.0050  1.0000
  --------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
  Composite CO :   12.19   16.07   17.51   16.48   9.92   1.258   0.655   2.287   16.11  12.645
  --------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # #
* AT2 Int/Free
* File 1, Run 1, Scenario 2.
```

```
* # # # # # # # # # # # # # # # # # # # # # # # # #
 M582 Warning:
       The user supplied freeway average speed of 60.3
       will be used for all hours of the day. 100% of VMT
       has been assigned to a fixed combination of freeways
       and freeway ramps for all hours of the day and all
        vehicle types.


* Reading Hourly Roadway VMT distribution from the following external
* data file: ALLFWY.DEF


 Reading User Supplied ROADWAY VMT Factors
 M616 Comment:
         User has supplied post-1999 sulfur levels.
 M 48 Warning:
           there are no sales for vehicle class HDGV8b


               Calendar Year:  2003
                      Month:  Jan.
                    Altitude:  Low
        Minimum Temperature:  45.0 (F)
        Maximum Temperature:  73.0 (F)
          Absolute Humidity:  75. grains/lb
          Nominal Fuel RVP:  8.5 psi
             Weathered RVP:  8.5 psi
         Fuel Sulfur Content:  46. ppm


        Exhaust I/M Program:  Yes
           Evap I/M Program:  Yes
               ATP Program:  Yes
          Reformulated Gas:  No


 Ether Blend Market Share: 0.000     Alcohol Blend Market Share: 1.000
 Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.031
                     Alcohol Blend RVP Waiver: No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
------	------	------	------	------	------	------	------	------	------	------
VMT Distribution:	0.4421	0.2866	0.1136		0.0356	0.0022	0.0229	0.0919	0.0050	1.0000

```
-----------------------------------------------------------------------------------------------------------------
```
 Composite Emission Factors (g/mi):

Facility Type - Interstate / Freeway / Expressway							
			I/M		No I/M		Net Emission
Vehicle Class	Area Type	Speed	EF	0.917*EF	EF	0.083*EF	Factor (grams/mile)
LDGV	1	59.7	12.190	11.178	15.270	1.267	12.446
	2	60.3	12.240	11.224	15.330	1.272	12.496
Light Duty	3	63.2	12.270	11.252	15.360	1.275	12.526
Gasoline	4	64.8	12.270	11.252	15.360	1.275	12.526
Vehicles	5	64.2	12.270	11.252	15.360	1.275	12.526
LDGT1	1	59.7	16.070	14.736	19.830	1.646	16.382
	2	60.3	16.130	14.791	19.890	1.651	16.442
Light Duty	3	63.2	16.170	14.828	19.940	1.655	16.483
Gasoline	4	64.8	16.170	14.828	19.940	1.655	16.483
Trucks 1	5	64.2	16.170	14.828	19.940	1.655	16.483
LDGT2	1	59.7	17.510	16.057	21.690	1.800	17.857
	2	60.3	17.580	16.121	21.770	1.807	17.928
Light Duty	3	63.2	17.620	16.158	21.820	1.811	17.969
Gasoline	4	64.8	17.620	16.158	21.820	1.811	17.969
Trucks 2	5	64.2	17.620	16.158	21.820	1.811	17.969
HDGV	1	59.7	9.920	9.097	11.320	0.940	10.036
	2	60.3	10.170	9.326	11.600	0.963	10.289
Heavy Duty	3	63.2	10.330	9.473	11.780	0.978	10.450
Gasoline	4	64.8	10.330	9.473	11.780	0.978	10.450
Vehicles	5	64.2	10.330	9.473	11.780	0.978	10.450
LDDV	1	59.7	1.258	1.154	1.258	0.104	1.258
	2	60.3	1.268	1.163	1.268	0.105	1.268
Light Duty	3	63.2	1.275	1.169	1.275	0.106	1.275
Diesel	4	64.8	1.275	1.169	1.275	0.106	1.275
Vehicles	5	64.2	1.275	1.169	1.275	0.106	1.275
LDDT	1	59.7	0.655	0.601	0.655	0.054	0.655
	2	60.3	0.661	0.606	0.661	0.055	0.661
Light Duty	3	63.2	0.666	0.611	0.666	0.055	0.666
Diesel	4	64.8	0.666	0.611	0.666	0.055	0.666
Trucks	5	64.2	0.666	0.611	0.666	0.055	0.666
HDDV	1	59.7	2.287	2.097	2.287	0.190	2.287
	2	60.3	2.324	2.131	2.324	0.193	2.324
Heavy Duty	3	63.2	2.349	2.154	2.349	0.195	2.349
Diesel	4	64.8	2.349	2.154	2.349	0.195	2.349
Vehicles	5	64.2	2.349	2.154	2.349	0.195	2.349
MC	1	59.7	16.110	14.773	16.110	1.337	16.110
	2	60.3	16.790	15.396	16.790	1.394	16.790
Motorcycles	3	63.2	17.230	15.800	17.230	1.430	17.230
	4	64.8	17.230	15.800	17.230	1.430	17.230
	5	64.2	17.230	15.800	17.230	1.430	17.230

Facility Type - Principal Arterials / Minor Arterials							
Vehicle Class	Area Type	Speed	I/M		No I/M		Net Emission Factor (grams/mile)
			EF	0.917*EF	EF	0.083*EF	
LDGV	1	30.3	9.530	8.739	12.220	1.014	9.753
	2	34.4	9.610	8.812	12.280	1.019	9.832
Light Duty	3	36.1	9.710	8.904	12.400	1.029	9.933
Gasoline	4	39.0	9.930	9.106	12.670	1.052	10.157
Vehicles	5	42.6	10.220	9.372	13.000	1.079	10.451
LDGT1	1	30.3	13.030	11.949	16.460	1.366	13.315
	2	34.4	13.140	12.049	16.550	1.374	13.423
Light Duty	3	36.1	13.260	12.159	16.680	1.384	13.544
Gasoline	4	39.0	13.530	12.407	16.980	1.409	13.816
Trucks 1	5	42.6	13.860	12.710	17.360	1.441	14.151
LDGT2	1	30.3	14.120	12.948	17.940	1.489	14.437
	2	34.4	14.230	13.049	18.020	1.496	14.545
Light Duty	3	36.1	14.370	13.177	18.170	1.508	14.685
Gasoline	4	39.0	14.670	13.452	18.510	1.536	14.989
Trucks 2	5	42.6	15.050	13.801	18.940	1.572	15.373
HDGV	1	30.3	8.360	7.666	9.530	0.791	8.457
	2	34.4	7.490	6.868	8.550	0.710	7.578
Heavy Duty	3	36.1	7.250	6.648	8.270	0.686	7.335
Gasoline	4	39.0	6.930	6.355	7.910	0.657	7.011
Vehicles	5	42.6	6.750	6.190	7.700	0.639	6.829
LDDV	1	30.3	1.311	1.202	1.311	0.109	1.311
	2	34.4	1.231	1.129	1.231	0.102	1.231
Light Duty	3	36.1	1.207	1.107	1.207	0.100	1.207
Diesel	4	39.0	1.173	1.076	1.173	0.097	1.173
Vehicles	5	42.6	1.147	1.052	1.147	0.095	1.147
LDDT	1	30.3	0.688	0.631	0.688	0.057	0.688
	2	34.4	0.638	0.585	0.638	0.053	0.638
Light Duty	3	36.1	0.622	0.570	0.622	0.052	0.622
Diesel	4	39.0	0.601	0.551	0.601	0.050	0.601
Trucks	5	42.6	0.584	0.536	0.584	0.048	0.584
HDDV	1	30.3	2.472	2.267	2.472	0.205	2.472
	2	34.4	2.195	2.013	2.195	0.182	2.195
Heavy Duty	3	36.1	2.110	1.935	2.110	0.175	2.110
Diesel	4	39.0	1.993	1.828	1.993	0.165	1.993
Vehicles	5	42.6	1.901	1.743	1.901	0.158	1.901
MC	1	30.3	10.210	9.363	10.210	0.847	10.210
	2	34.4	9.250	8.482	9.250	0.768	9.250
Motorcycles	3	36.1	8.930	8.189	8.930	0.741	8.930
	4	39.0	8.460	7.758	8.460	0.702	8.460
	5	42.6	8.040	7.373	8.040	0.667	8.040

Facility Type - Collectors							
			I/M		No I/M		Net Emission
Vehicle Class	Area Type	Speed	EF	0.917*EF	EF	0.083*EF	Factor (grams/mile)
LDGV	1	18.2	10.060	9.225	13.120	1.089	10.314
	2	19.1	9.970	9.142	12.980	1.077	10.220
Light Duty	3	24.4	9.640	8.840	12.450	1.033	9.873
Gasoline	4	24.7	9.620	8.822	12.430	1.032	9.853
Vehicles	5	28.2	9.550	8.757	12.280	1.019	9.777
LDGT1	1	18.2	13.660	12.526	17.440	1.448	13.974
	2	19.1	13.560	12.435	17.290	1.435	13.870
Light Duty	3	24.4	13.160	12.068	16.710	1.387	13.455
Gasoline	4	24.7	13.150	12.059	16.680	1.384	13.443
Trucks 1	5	28.2	13.060	11.976	16.520	1.371	13.347
LDGT2	1	18.2	14.910	13.672	19.150	1.589	15.262
	2	19.1	14.780	13.553	18.960	1.574	15.127
Light Duty	3	24.4	14.300	13.113	18.250	1.515	14.628
Gasoline	4	24.7	14.280	13.095	18.220	1.512	14.607
Trucks 2	5	28.2	14.160	12.985	18.020	1.496	14.480
HDGV	1	18.2	14.290	13.104	16.300	1.353	14.457
	2	19.1	13.600	12.471	15.500	1.287	13.758
Heavy Duty	3	24.4	10.450	9.583	11.910	0.989	10.571
Gasoline	4	24.7	10.310	9.454	11.750	0.975	10.430
Vehicles	5	28.2	8.990	8.244	10.250	0.851	9.095
LDDV	1	18.2	1.803	1.653	1.803	0.150	1.803
	2	19.1	1.748	1.603	1.748	0.145	1.748
Light Duty	3	24.4	1.490	1.366	1.490	0.124	1.490
Diesel	4	24.7	1.479	1.356	1.479	0.123	1.479
Vehicles	5	28.2	1.365	1.252	1.365	0.113	1.365
LDDT	1	18.2	1.000	0.917	1.000	0.083	1.000
	2	19.1	0.965	0.885	0.965	0.080	0.965
Light Duty	3	24.4	0.802	0.735	0.802	0.067	0.802
Diesel	4	24.7	0.795	0.729	0.795	0.066	0.795
Trucks	5	28.2	0.723	0.663	0.723	0.060	0.723
HDDV	1	18.2	4.183	3.836	4.183	0.347	4.183
	2	19.1	3.991	3.660	3.991	0.331	3.991
Heavy Duty	3	24.4	3.095	2.838	3.095	0.257	3.095
Diesel	4	24.7	3.055	2.801	3.055	0.254	3.055
Vehicles	5	28.2	2.661	2.440	2.661	0.221	2.661
MC	1	18.2	15.100	13.847	15.100	1.253	15.100
	2	19.1	14.550	13.342	14.550	1.208	14.550
Motorcycles	3	24.4	12.080	11.077	12.080	1.003	12.080
	4	24.7	11.980	10.986	11.980	0.994	11.980
	5	28.2	10.800	9.904	10.800	0.896	10.800

Facility Type - Local							
			I/M		No I/M		Net Emission
Vehicle Class	Area Type	Speed	EF	0.917*EF	EF	0.083*EF	Factor (grams/mile)
LDGV	1	12.9	10.830	9.931	14.300	1.187	11.118
	2	12.9	10.830	9.931	14.300	1.187	11.118
Light Duty	3	12.9	10.830	9.931	14.300	1.187	11.118
Gasoline	4	12.9	10.830	9.931	14.300	1.187	11.118
Vehicles	5	12.9	10.830	9.931	14.300	1.187	11.118
LDGT1	1	12.9	14.580	13.370	18.760	1.557	14.927
	2	12.9	14.580	13.370	18.760	1.557	14.927
Light Duty	3	12.9	14.580	13.370	18.760	1.557	14.927
Gasoline	4	12.9	14.580	13.370	18.760	1.557	14.927
Trucks 1	5	12.9	14.580	13.370	18.760	1.557	14.927
LDGT2	1	12.9	16.040	14.709	20.750	1.722	16.431
	2	12.9	16.040	14.709	20.750	1.722	16.431
Light Duty	3	12.9	16.040	14.709	20.750	1.722	16.431
Gasoline	4	12.9	16.040	14.709	20.750	1.722	16.431
Trucks 2	5	12.9	16.040	14.709	20.750	1.722	16.431
HDGV	1	12.9	19.850	18.202	22.640	1.879	20.082
	2	12.9	19.850	18.202	22.640	1.879	20.082
Heavy Duty	3	12.9	19.850	18.202	22.640	1.879	20.082
Gasoline	4	12.9	19.850	18.202	22.640	1.879	20.082
Vehicles	5	12.9	19.850	18.202	22.640	1.879	20.082
LDDV	1	12.9	2.236	2.050	2.236	0.186	2.236
	2	12.9	2.236	2.050	2.236	0.186	2.236
Light Duty	3	12.9	2.236	2.050	2.236	0.186	2.236
Diesel	4	12.9	2.236	2.050	2.236	0.186	2.236
Vehicles	5	12.9	2.236	2.050	2.236	0.186	2.236
LDDT	1	12.9	1.275	1.169	1.275	0.106	1.275
	2	12.9	1.275	1.169	1.275	0.106	1.275
Light Duty	3	12.9	1.275	1.169	1.275	0.106	1.275
Diesel	4	12.9	1.275	1.169	1.275	0.106	1.275
Trucks	5	12.9	1.275	1.169	1.275	0.106	1.275
HDDV	1	12.9	5.688	5.216	5.688	0.472	5.688
	2	12.9	5.688	5.216	5.688	0.472	5.688
Heavy Duty	3	12.9	5.688	5.216	5.688	0.472	5.688
Diesel	4	12.9	5.688	5.216	5.688	0.472	5.688
Vehicles	5	12.9	5.688	5.216	5.688	0.472	5.688
MC	1	12.9	20.110	18.441	20.110	1.669	20.110
	2	12.9	20.110	18.441	20.110	1.669	20.110
Motorcycles	3	12.9	20.110	18.441	20.110	1.669	20.110
	4	12.9	20.110	18.441	20.110	1.669	20.110
	5	12.9	20.110	18.441	20.110	1.669	20.110

Appendix 5.3

Vehicle Registration Data

07/24/02
MV630-241-1

ARIZONA DEPARTMENT OF TRANSPORTATION
MOTOR VEHICLE DIVISION
VEHICLE REGISTRATION REPORT

PAGE   7
MV944

| CTY | YEAR | VEH. YEAR SUBTOTAL | LIGHT DUTY VEH. | | LIGHT DUTY TRUCK | | | HEAVY DUTY VEH. | | BUS | MOTOR-CYCLES | ALTERNATE FUELS | ELECTRIC |
			GAS	DIESEL	GAS TK1	GAS TK2	DIESEL	GAS	DIESEL				
MAR	2002	154,688	118,528	550	23,403	2,656	1,873	897	1,739	285	4,181	51	525
MAR	2001	219,424	157,596	704	41,009	4,430	2,912	1,618	2,500	398	5,401	1,991	865
MAR	2000	220,921	158,207	920	35,077	4,101	2,604	4,987	3,873	388	4,676	2,378	3,710
MAR	1999	186,382	139,607	613	27,222	3,562	3,137	2,900	3,484	366	4,076	301	1,114
MAR	1998	161,213	119,108	533	28,187	3,049	815	2,683	2,241	347	2,984	462	804
MAR	1997	159,422	114,701	400	29,582	3,044	1,899	4,041	2,371	297	2,278	85	724
MAR	1996	134,920	100,834	340	23,035	2,714	1,206	1,531	2,272	194	2,036	79	679
MAR	1995	141,098	104,948	302	24,453	2,863	983	2,538	2,521	253	1,609	65	563
MAR	1994	123,265	88,597	252	23,877	2,777	613	2,057	2,987	217	1,329	80	479
MAR	1993	103,522	78,587	197	16,850	2,090	708	1,999	1,144	217	1,234	24	472
MAR	1992	81,364	63,821	226	12,557	1,464	426	567	794	159	849	28	473
MAR	1991	76,462	60,462	222	11,386	1,250	332	477	835	290	604	14	590
MAR	1990	71,905	54,194	159	9,997	1,174	258	427	4,279	203	612	11	591
MAR	1989	70,968	51,532	170	11,739	1,493	208	968	3,705	177	596	18	362
MAR	1988	57,426	42,265	178	8,830	1,227	139	1,998	1,691	169	573	14	342
MAR	1987	47,580	36,597	309	7,512	646	171	396	702	132	640	10	465
MAR	1986	44,981	30,961	274	9,832	928	297	497	662	131	1,036	9	354
MAR	1985	36,356	25,657	410	6,891	793	238	435	569	117	865	17	364
MAR	1984	26,570	18,511	406	5,130	548	258	261	379	97	636	12	332
MAR	1983	16,068	10,546	478	3,200	284	188	131	179	134	684	10	234
MAR	1982	12,257	7,016	434	2,601	331	203	159	168	102	846	6	391
MAR	1981	10,401	5,716	283	2,622	376	94	151	189	53	578	3	336
MAR	1980	8,027	4,424	221	1,714	280	52	190	172	61	508	8	397
MAR	1979	11,507	6,794	179	2,728	497	47	410	156	96	334	8	258
MAR	1978	10,261	5,935	102	2,799	527	30	183	112	71	337	12	153
MAR	1977	80,890	49,945	250	23,480	2,675	148	1,100	276	441	1,816	21	738
TOT	2002	2,267,878	1,655,089	9,112	395,713	45,779	19,839	33,601	40,000	5,395	41,318	5,717	16,315

Appendix 5.4

Minimum and Maximum Temperature Calculations

For the analysis of peak season CO emissions, the same methodology was used as for previous carbon monoxide periodic inventories, using an amalgam of the top ten CO concentration days in the late 1980s. A memo showing the calculation of the maximum and minimum daily temperature used for the peak CO inventory follows.

For the analysis of CO annual average emissions, each month was analyzed separately with unique temperature data for each month. Average monthly minimum and maximum temperatures for each month of 2002 were obtained from the NOAA Local Climatological Data (LCD) reports for Sky Harbor Airport. Specifically, the average maximum and minimum temperatures for each month, as reported in the LCD reports were averaged by MAG to obtain annual average daily maximum and minimum temperatures, as shown in the table below. A portion of the LCD report for January 2002 also follows.

Month	Daily Max	Daily Min	Number of Days
January	67.1	44.8	31
February	74.8	47.8	28
March	78.1	52.3	31
April	89.2	64.1	30
May	95.2	68.2	31
June	107.3	79.5	30
July	107.2	84.8	31
August	106.2	83.9	31
September	101.4	78.2	30
October	86.2	64.0	31
November	78.5	55.3	30
December	65.0	45.4	31
Annual Average	88.1	64.1	

ENVIRONMENTAL QUALITY & COMMUNITY SERVICES AGENCY
DIVISION OF AIR POLLUTION CONTROL
2406 South 24th Street, Suite E-214
Phoenix, Arizona 85034

(602) 506-6700
(602) 506-6862 (FAX)

April 21, 1992

Cari Anderson
Maricopa Association of Governments
Transportation & Planning Office
2612 S. 46th St.
Phoenix, AZ 85034

Dear Cari:

Following EPA's interim guidance on temperature determinations, I have calculated the average minimum and maximum temperatures for ozone and carbon monoxide SIP emission inventory calculations. I have also calculated the ambient temperature for ozone should you have to use this factor.

The attached tables show the calculations. Please call if you have any questions.

Sincerely,

Jo Crumbaker, Manager
Planning and Analysis

cc: Gary Neuroth, ADEQ

JC/cf/Anderson.ltr

TABLE 1
CARBON MONOXIDE
SEASON: NOVEMBER - JANUARY
(88-89, 89-90, 90-91)

	DATE	SITE	MAX. CONC.	MAX. TEMP.	MIN. TEMP.
1.	1-01-89	W. Phx	15.3	65	35
2.	1-17-89	W. Phx	12.6	69	40
3.	11-24-88	W. Phx	12.4	63	49
4.	12-14-89	WISR	12.3	63	37
5.	1-12-89	W. Phx	11.9	75	40
6.	11-17-90	WISR	11.6	86	63
7.	1-19-89	W. Phx	11.5	77	44
8.	12-09-89	WISR	11.2	75	47
*	1-01-89	C. Phx	11.2		
9.	11-23-88	W. Phx	11.0	77	49
10.	12-03-88	C. Phx	11.0	77	47
*	12-14-89	W. Phx	11.0		
			Average	73.1 73°F	45.1 45°F

* Value not included in ranking because the associated date was identified with a previous max value.

JC/dg/Table1.CM

TABLE 2

OZONE

SEASON: JULY - SEPTEMBER

	DATE	SITE	MAX. CONC.	MAX. TEMP.	MIN. TEMP.
1.	7-11-90	VEI	.141	107	83
2.	9-06-90	Papago	.141	95	72
*	9-06-90	VEI	.14		
3.	9-09-88	Glendale	.140	108	80
4.	9-13-90	Papago	.138	98	71
*	9-13-90	VEI	.13		
5.	9-08-90	VEI	.13	103	78
6.	9-10-90	Papago	.130	98	78
*	9-10-90	VEI	.13		
*	9-10-90	W. Phx	.127		
*	9-10-90	S. Phx	.126		
*	9-08-90	Papago	.126		
*	9-08-90	Glendale	.126		
*	9-9-88	C. Phx	.125		
7.	7-02-89	VEI	.124	112	83
8.	7-28-90	VEI	.124	111	85
9.	8-4-90	LKPL	.124	109	6
10.	9-11-90	LKPL	.124	98	80

Average: 103.9°F / 104°F   79.7°F / 80°

* Value not included in the ranking because the associated date was identified with a previous max value.

Ambient temp = [(2/3) X (Avg. Max. Temp. - Avg. min. Temp)]+avg. min. temp.)
     = 2/3 X (104-80) + 80
     = 96°F

JC/dg/Table2.0%

SEP 1983
PHOENIX, AZ
NAT'L WEA SER FCST OFC.
2633 E. BUCKEYE RD.

ISSN 0198-0725

LOCAL
CLIMATOLOGICAL DATA
Monthly Summary

SKY HARBOR INTL AIRPORT

PHOENIX, AZ SEP 1983

LATITUDE 33° 26' N   LONGITUDE 112° 01' W   ELEVATION (GROUND) 1110 FEET   TIME ZONE MOUNTAIN   23183

DATE	TEMPERATURE °F MAXIMUM	MINIMUM	AVERAGE	DEPARTURE FROM NORMAL	AVERAGE DEW POINT	DEGREE DAYS BASE 65°F HEATING (7A)	COOLING (7B)	WEATHER TYPES (8)	SNOW ICE PELLETS (9)	PRECIPITATION WATER EQUIVALENT (10)	SNOW ICE PELLETS (11)	STATION PRESSURE (12)	WIND RESULTANT DIR (13)	RESULTANT SPEED (14)	AVERAGE SPEED (15)	PEAK GUST SPEED (16)	DIRECTION (17)	FASTEST 1-MIN SPEED (18)	DIRECTION (19)	SUNSHINE MINUTES (20)	PERCENT (21)	SKY COVER SUNRISE-SUNSET (22)	MIDNIGHT-MIDNIGHT (23)
01	105	83	94	6	63	0	29		0	0.00	0.0	28.570	11	4.7	6.3	22	SE	15	14	695	90	..	2
02	104	84	94	6	60	0	29		0	0.00	0.0	28.660	08	8.2	9.2	20	E	14	11	771	100	..	0
03	105	85	95*	8	53	0	30		0	0.00	0.0	28.690	08	11.8	12.4	28	SE	17	07	708	92	..	2
04	101	87	94	7	49	0	29		0	0.00	0.0	28.720	09	11.8	12.8	28	E	21	11	383	50	..	7
05	100	83	92	5	43	0	27		0	0.00	0.0	28.680	10	10.3	12.0	25	SE	17	05	650	85	..	4
06	103	76	90	3	45	0	25		0	0.00	0.0	28.650	09	4.8	5.7	18	SE	13	07	742	100	..	0
07	104	78	91	4	45	0	26		0	0.00	0.0	28.610	13	2.2	6.3	14	NW	12	08	745	99	..	1
08	104	79	92	5	52	0	27		0	0.00	0.0	28.630	24	1.0	5.5	14	W	10	05	730	96	..	1
09	108*	80	94	8	53	0	29		0	0.00	0.0	28.580	13	0.5	4.3	14	W	9	27	755	100	..	0
10	106	82	94	8	52	0	29		0	0.00	0.0	28.530	29	1.3	5.1	17	NW	13	30	550	73	..	4
11	103	81	92	6	53	0	27		0	0.00	0.0	28.535	18	1.2	7.3	21	SW	14	23	451	60	..	5
12	98	78	88	2	45	0	23		0	0.00	0.0	28.620	20	3.3	8.5	20	W	16	27	750	100	..	1
13	97	71	84	-2	38	0	19		0	0.00	0.0	28.710	21	0.7	4.3	15	NE	9	25	748	100	..	1
14	96	71	84	-1	39	0	19		0	0.00	0.0	28.705	24	1.2	5.5	18	SW	12	24	746	100	..	1
15	101	72	87	2	39	0	22		0	0.00	0.0	28.670	11	3.6	5.2	14	E	9	10	744	100	..	0
16	104	73	89	4	43	0	24		0	0.00	0.0	28.630	09	1.8	5.3	14	E	9	10	742	100	..	0
17	102	73	88	3	44	0	23		0	0.00	0.0	28.545	25	0.6	5.3	14	NW	9	27	740	100	..	0
18	99	73	86	2	43	0	21		0	0.00	0.0	28.590	12	0.7	4.2	15	SW	12	22	738	100	..	0
19	100	72	86	2	42	0	21		0	0.00	0.0	28.620	11	1.4	7.0	15	E	12	09	735	100	..	0
20	100	73	87	3	47	0	22		0	0.00	0.0	28.550	17	8.9	12.7	30	S	21	20	734	100	1	1
21	87	72	80	-3	53	0	15		0	0.00	0.0	28.700	27	6.0	9.6	23	W	17	25	718	98	..	1
22	86	64*	75*	-8	41	0	10		0	0.00	0.0	28.785	27	3.3	5.4	18	W	13	27	729	100	..	0
23	92	66	79	-4	40	0	14		0	0.00	0.0	28.770	10	3.8	5.7	21	NE	10	07	727	100	..	0
24	96	67	82	0	41	0	17		0	0.00	0.0	28.780	09	2.1	5.7	13	NW	9	11	726	100	..	0
25	98	70	84	2	43	0	19		0	0.00	0.0	28.810	08	1.2	5.3	15	NE	12	09	723	100	..	0
26	99	74	87	5	49	0	22		0	0.00	0.0	28.820	13	0.4	4.1	15	W	10	30	706	98	1	1
27	99	73	86	5	45	0	21		0	0.00	0.0	28.750	26	1.4	5.1	18	W	13	26	719	100	..	4
28	100	68	84	3	40	0	19		0	0.00	0.0	28.720	24	1.8	5.7	15	W	14	26	657	93	..	3
29	98	72	85	4	27	0	20		0	0.00	0.0	28.730	09	2.1	6.1	16	NE	10	10	690	97	..	3
30	99	70	85	5	30	0	20		0	0.00	0.0	28.710	11	0.8	4.4	13	W	10	27	700	98	..	1

| | SUM 2994 | SUM 2250 | | | | TOTAL 0 | TOTAL 679 | | | TOTAL 0.00 | TOTAL 0.0 | 28.670 | 11 | 2.0 | 5.9 | 30 | S | 21 | 20 | TOTAL 20983 | | SUM 41 | SUM 40 |
| | AVG. 99.8 | AVG. 75.0 | AVG. 87.4 | DEP. 2.8 | AVG. 45.3 | DEP. 0 | DEP. 90 | | | DEP. -0.64 | | | | | | DATE:20 | | DATE:20 | | 22284 | 94 | AVG. 1.3 | AVG. 1.3 |

NUMBER OF DAYS

SEASON TO DATE: TOTAL 0 TOTAL 4339

MAXIMUM TEMP. ≥ 90°	≤ 32°	MINIMUM TEMP. ≤ 32°	≤ 0°
28	0	0	0

PRECIPITATION: ≥ .01 INCH 0   ≥ 1.0 INCH 0

SNOW, ICE PELLETS: ≥ 1.0 INCH DEP.

THUNDERSTORMS 0   HEAVY FOG 0   CLEAR 25   PARTLY CLOUDY 5   CLOUDY 0

GREATEST IN 24 HOURS AND DATES
PRECIPITATION 0.00   SNOW, ICE PELLETS 0.0

GREATEST DEPTH ON GROUND OF SNOW, ICE PELLETS OR ICE AND DATE 0

* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.
T TRACE AMOUNT.
+ ALSO ON EARLIER DATE(S).
HEAVY FOG: VISIBILITY 1/4 MILE OR LESS.
BLANK ENTRIES DENOTE MISSING OR UNREPORTED DATA.

DATA IN COLS 6 AND 12-15 ARE BASED ON 21 OR MORE OBSERVATIONS AT HOURLY INTERVALS. RESULTANT WIND IS THE VECTOR SUM OF WIND SPEEDS AND DIRECTIONS DIVIDED BY THE NUMBER OF OBSERVATIONS. COLS 16 & 17: PEAK GUST - HIGHEST INSTANTANEOUS WIND SPEED. ONE OF TWO WIND SPEEDS IS GIVEN UNDER COLS 18 & 19: FASTEST MILE - HIGHEST RECORDED SPEED FOR WHICH A MILE OF WIND PASSES STATION (DIRECTION IN COMPASS POINTS). FASTEST OBSERVED ONE MINUTE WIND - HIGHEST ONE MINUTE SPEED (DIRECTION IN TENS OF DEGREES). ERRORS WILL BE CORRECTED IN SUBSEQUENT PUBLICATIONS.

I CERTIFY THAT THIS IS AN OFFICIAL PUBLICATION OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, AND IS COMPILED FROM RECORDS ON FILE AT THE NATIONAL CLIMATIC DATA CENTER

Kenneth D. Hadeen

DIRECTOR
NATIONAL CLIMATIC DATA CENTER

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JUL 1989
PHOENIX, AZ
NAT'L WEA SER FCST OFC
2633 S. BUCKEYE RD.

SKY HARBOR INTL AIRPORT

ISSN 0198-0419

LOCAL CLIMATOLOGICAL DATA
Monthly Summary

LATITUDE 33° 26' N   LONGITUDE 112° 01' W   ELEVATION (GROUND) 1110 FEET   TIME ZONE MOUNTAIN   23183

PHOENIX, AZ JUL 1989

DATE	TEMPERATURE °F					DEGREE DAYS BASE 65°F		WEATHER TYPES 1 FOG 2 HEAVY FOG 3 THUNDERSTORM 4 ICE PELLETS 5 HAIL 6 GLAZE 7 DUSTSTORM 8 SMOKE, HAZE 9 BLOWING SNOW	SNOW ICE PELLETS OR ICE ON GROUND AT 0500 INCHES	PRECIPITATION		AVERAGE STATION PRESSURE IN INCHES ELEV. 1107 FEET ABOVE M.S.L.	WIND (M.P.H.)							SUNSHINE		SKY COVER (TENTHS)	
	MAXIMUM	MINIMUM	AVERAGE	DEPARTURE FROM NORMAL	AVERAGE DEW POINT	HEATING (SEASON BEGINS WITH JUL)	COOLING (SEASON BEGINS WITH JAN)			WATER EQUIVALENT (INCHES)	SNOW, ICE PELLETS (INCHES)		RESULTANT DIR.	RESULTANT SPEED	AVERAGE SPEED	PEAK GUST SPEED	PEAK GUST DIRECTION	FASTEST 1-MIN SPEED	FASTEST 1-MIN DIRECTION	MINUTES	PERCENT OF TOTAL POSSIBLE	SUNRISE TO SUNSET	MIDNIGHT TO MIDNIGHT
1	2	3	4	5	6	7A	7B	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	112	81	97	6	41	0	32		0	0.00	0.0	28.630	30	2.4	5.9	22	NW	12	27	560	100	1	3
02	112	83	98	7	45	0	33		0	0.00	0.0	28.660	29	2.7	4.7	18	NW	13	27	550	100	1	1
03	115	82	99	8	37	0	34		0	0.00	0.0	28.640	24	2.0	5.7	21	W	12	25	353	100	1	1
04	118x	83	101	10	38	0	36		0	0.00	0.0	28.620	24	2.1	6.6	18	SW	14	26	359	100	1	3
05	114	87	101	10	47	0	36		0	0.00	0.0	28.650	26	3.6	8.4	18	W	17	25	356	100	2	0
06	113	88	101	9	53	0	36		0	0.00	0.0	28.680	28	4.1	6.6	17	SW	12	25	305	94	3	5
07	112	91	102	10	54	0	37		0	0.00	0.0	28.730	30	3.9	6.9	17	NW	13	27	357	100	1	2
08	111	90	101	9	55	0	36		0	T	0.0	28.670	29	3.8	8.0	26	E	16	28	533	82	3	8
09	107	84	96	4	55	0	31		0	0.00	0.0	28.630	23	2.2	9.0	25	W	16	27	320	96	3	4
10	105	83	94	2	51	0	29	3	0	T	0.0	28.680	13	4.4	8.4	31	SE	16	14	377	72	5	7
11	100	79	90	-2	60	0	25		0	0.00	0.0	28.780	06	1.5	6.2	17	W	12	29	751	89	3	5
12	109	83	96	4	54	0	31		0	0.00	0.0	28.770	27	1.4	5.5	17	W	13	27	353	100	3	0
13	114	83	99	6	49	0	34		0	0.00	0.0	28.676	25	4.6	5.7	21	W	13	28	851	100	1	0
14	115x	87	101	8	49	0	36		0	0.00	0.0	28.610	25	4.8	7.9	24	W	15	25	351	100	2	6
15	109	87	98	5	51	0	33		0	0.00	0.0	28.710	28	7.2	9.0	16	W	14	27	525	97	1	2
16	107	88	98	5	58	0	33		0	T	0.0	28.755	29	3.6	5.9	17	W	10	28	755	89	3	6
17	113	88	99	6	56	0	34		0	0.00	0.0	28.700	28	4.1	6.2	20	W	15	27	948	100	1	2
18	115	88	102	9	50	0	37		0	0.00	0.0	28.640	26	5.1	6.4	17	W	15	27	846	100	1	2
19	116	90	103	10	55	0	38		0	0.00	0.0	28.660	13	6.4	10.0	36	NE	23	06	945	100	3	4
20	113	93	103x	10	57	0	38		0	0.00	0.0	28.655	14	2.0	8.7	23	E	14	09	753	91	3	7
21	109	79	94	1	61	0	29	3	0	T	0.0	28.650	26	2.4	9.6	37	SW	21	22	735	87	3	7
22	104	80	92	-1	56	0	27		0	0.03	0.0	28.710	26	3.7	7.4	18	W	14	27	744	91	3	7
23	109	86	98	5	52	0	33		0	T	0.0	28.700	23	4.1	7.2	24	SW	16	24	727	86	3	6
24	111	88	100	7	61	0	35		0	0.00	0.0	28.620	10	1.2	7.2	17	W	14	27	734	87	3	3
25	110	89	100	7	59	0	35		0	T	0.0	28.620	10	7.3	11.3	33	NE	26	06	781	93	3	4
26	108	86	97	4	60	0	32		0	0.00	0.0	28.710	10	6.0	9.1	24	SE	17	14	756	90	3	4
27	105	76	91	-1	61	0	26	3	0	0.03	0.0	28.760	11	4.7	8.9	33	W	17	02	710	85	5	7
28	100	76x	88x	-4	66	0	23		0	0.03	0.0	28.730	10	2.4	5.8	22	NE	14	08	525	75	5	6
29	104	83	94	2	64	0	29		0	0.00	0.0	28.680	35	2.3	6.8	18	W	12	27	803	97	3	5
30	108	86	97	5	62	0	32	3	0	0.01	0.0	28.640	18	1.3	6.1	20	NE	12	06	319	99	3	4
31	108	88	98	6	64	0	33		0	T	0.0	28.540	11	4.1	7.3	36	W	18	25	648	78	5	5

	SUM	SUM				TOTAL	TOTAL	NUMBER OF DAYS		TOTAL	TOTAL			FOR THE MONTH:						TOTAL	%	SUM	SUM
	3404	2635				0	1013			0.13	0.0	28.680	24	1.0	7.4	37	SW	26	06	24199		92	129
	AVG.	AVG.	AVG.	DEP	AVG.	DEP	DEP	PRECIPITATION		DEP					DATE:21		DATE:25		POSSIBLE		AVG	AVG
	109.8	85.0	97.4	5.1	55.0	0	167	> .01 INCH 5		-0.61									25257	93	3.4	4.0

NUMBER OF DAYS				SEASON TO DATE		SNOW, ICE PELLETS	GREATEST IN 24 HOURS AND DATES			GREATEST DEPTH ON GROUND OF SNOW, ICE PELLETS OR ICE AND DATE	
				TOTAL	TOTAL	> 1.0 INCH					
MAXIMUM TEMP.		MINIMUM TEMP.		0	3118	THUNDERSTORMS 5	PRECIPITATION	SNOW, ICE PELLETS		0	
≥ 90°	≤ 32°	≤ 32°	≤ 0°	DEP	DEP	HEAVY FOG 0	0.06, 27-28	0.0			
31	0	0	0	0	1038	CLEAR 15 PARTLY CLOUDY 16 CLOUDY 0					

x EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.
T TRACE AMOUNT.
+ ALSO ON EARLIER DATE(S).
HEAVY FOG: VISIBILITY 1/4 MILE OR LESS.
BLANK ENTRIES DENOTE MISSING OR UNREPORTED DATA.

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JUL 1990
PHOENIX, AZ
NAT'L WEA SER FCT OFC NOAA
2633 E. BUCKEYE RD.

ISSN 0198-0433

LOCAL
CLIMATOLOGICAL DATA
Monthly Summary

SKY HARBOR INTL AIRPORT

LATITUDE 33° 26' N   LONGITUDE 112° 01' W   ELEVATION (GROUND) 1110 FEET   TIME ZONE MOUNTAIN   23:53

DATE	TEMPERATURE °F					DEGREE DAYS BASE 65°F		WEATHER TYPES 1 FOG 2 HEAVY FOG 3 THUNDERSTORM 4 ICE PELLETS 5 HAIL 6 GLAZE 7 DUSTSTORM 8 SMOKE, HAZE 9 BLOWING SNOW	SNOW ICE PELLETS OR ICE ON GROUND AT 0500 INCHES	PRECIPITATION		AVERAGE STATION PRESSURE in INCHES ELEV. 1107 FEET ABOVE M.S.L.	WIND (M.P.H.)							SUNSHINE		SKY COVER (TENTHS)	
	MAXIMUM	MINIMUM	AVERAGE	DEPARTURE FROM NORMAL	AVERAGE DEW POINT	HEATING (SEASON BEGINS WITH JUL)	COOLING (SEASON BEGINS WITH JAN)			WATER EQUIVALENT (INCHES)	SNOW, ICE PELLETS (INCHES)		RESULTANT DIR	RESULTANT SPEED	AVERAGE SPEED	PEAK GUST SPEED	PEAK GUST DIRECTION	FASTEST 1-MIN SPEED	FASTEST 1-MIN DIRECTION	MINUTES	PERCENT OF TOTAL POSSIBLE	SUNRISE TO SUNSET	MIDNIGHT TO MIDNIGHT
1	2	3	4	5	6	7A	7B	8	9	10	11	12	13	14	15	16	17	18	19	20	21		
01	115*	90	103*	12	61	0	38	3	0	0.00	0.0	28.600	28	2.0	5.5	32	NE	21	06	752	NT		6
02	106	84	95	4	64	0	30	3	0	0.03	0.0	28.615	21	2.6	5.4	27	E	18	11	725	84		7
03	105	81	93	2	64	0	28		0	T	0.0	28.640	23	1.1	5.5	26	W	13	27	783	91		3
04	107	87	97	6	59	0	32		0	0.00	0.0	28.650	26	2.9	4.3	17	SW	13	26	344	98		3
05	100	87	94	3	59	0	29		0	0.00	0.0	28.660	09	4.8	5.5	13	E	9	12	559	77		8
06	98	84	91	-1	56	0	26		0	0.01	0.0	28.650	12	4.6	7.5	17	E	13	11	522	61		9
07	100	79	90	-2	63	0	25		0	0.03	0.0	28.640	15	3.0	5.1	39	S	25	17	744	87		7
08	100	78	89	-3	69	0	24		0	T	0.0	28.690	13	5.3	5.4	22	SE	16	15	797	93		5
09	104	80	92	0	66	0	27		0	0.00	0.0	28.750	15	2.5	6.3	17	W	13	26	740	87		5
10	106	79	93	1	67	0	28	3	0	0.27	0.0	28.740	08	1.9	8.6	32	NE	24	06	633	80		7
11	106	80	93	1	67	0	28	3	0	T	0.0	28.720	25	1.4	5.5	13	N	10	08	703	82		7
12	112	87	100	8	63	0	35		0	T	0.0	28.740	13	4.7	7.7	26	SE	14	14	700	82		8
13	110	86	98	5	63	0	33		0	0.00	0.0	28.770	15	2.6	3.0	14	SE	10	35	683	80		7
14	94	81	88	-5	65	0	23		0	T	0.0	28.680	26	6.1	3.4	17	W	14	28	588	69		9
15	91	74	83*	-10	69	0	18	3	0	0.01	0.0	28.660	20	3.0	5.5	15	SE	13	17	60	7		9
16	100	82	91	-2	69	0	26		0	T	0.0	28.720	17	3.3	6.5	20	E	12	10	430	51		5
17	104	81	93	0	67	0	28		0	0.00	0.0	28.720	07	0.6	6.3	14	W	9	08	848	100		2
18	110	87	99	6	65	0	34		0	0.00	0.0	28.630	17	1.7	5.8	15	SW	10	24	846	100		0
19	112	88	100	7	64	0	35		0	0.00	0.0	28.590	23	2.9	5.9	15	SW	13	27	845	100		0
20	106	88	97	4	68	0	32		0	0.00	0.0	28.660	24	4.5	9.3	18	W	15	25	815	97		3
21	105	80	93	0	66	0	28	3	0	0.31	0.0	28.690	27	4.7	9.2	36	N	28	01	823	98		3
22	107	80	94	1	64	0	29		0	0.00	0.0	28.670	29	2.1	5.9	23	NW	14	16	788	94		3
23	104	82	93	0	60	0	28	3	0	0.00	0.0	28.660	14	5.5	8.3	39	E	29	11	817	97		4
24	97	72*	85	-8	65	0	20	3	0	0.38	0.0	28.660	12	3.9	8.3	43	N	16	15	687	82		4
25	102	83	93	0	67	0	28		0	0.00	0.0	28.680	20	2.2	7.5	14	SE	10	25	813	97		3
26	104	84	94	1	61	0	29		0	0.00	0.0	28.720	27	1.5	6.0	18	NW	9	28	837	100		0
27	107	84	96	4	53	0	31		0	0.00	0.0	28.695	26	2.2	5.1	14	W	9	30	835	100		0
28	108	81	95	3	51	0	30		0	0.00	0.0	28.670	27	2.2	5.8	17	W	12	27	833	100		0
29	111	81	96	4	51	0	31		0	0.00	0.0	28.670	25	2.0	5.6	18	W	12	26	833	100		2
30	107	87	97	5	55	0	32		0	T	0.0	28.720	12	6.0	8.9	39	E	25	08	814	98		2
31	106	84	95	3	58	0	30	3	0	T	0.0	28.700	15	3.8	9.5	29	E	21	18	829	100		3

	SUM	SUM				TOTAL	TOTAL	NUMBER OF DAYS		TOTAL	TOTAL	FOR THE MONTH:							TOTAL	Σ	SUM	SUM
	3244	2561				0	895			1.05	0.0	28.680	18	1.5	7.3	43	N	29	11	22679			132
	AVG.	AVG.	AVG.	DEP.	AVG.	DEP.	DEP.	PRECIPITATION		DEP.		DEP.				DATE:24	DATE:23				AVG.	AVG.	
	104.6	82.6	93.5	1.3	62.9	0	49	≥ .01 INCH	7	0.31										26367	86	4	3

NUMBER OF DAYS				SEASON TO DATE		SNOW, ICE PELLETS		GREATEST IN 24 HOURS AND DATES		GREATEST DEPTH ON GROUND OF SNOW, ICE PELLETS OR ICE AND DATE		
				TOTAL	TOTAL	≥ 1.0 INCH	0					
MAXIMUM TEMP.		MINIMUM TEMP.		DEP.	DEP.	THUNDERSTORMS	9	PRECIPITATION	SNOW, ICE PELLETS	0		
≥ 90°	< 32°	< 32°	< 0°	0	2793	HEAVY FOG	0	0.39	24	0.0	0	
				DEP.	DEP.	CLEAR 15	PARTLY CLOUDY 12	CLOUDY 4				
31	0	0	0	0	713							

* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.
T TRACE AMOUNT.
+ ALSO ON EARLIER DATE(S).
HEAVY FOG: VISIBILITY 1/4 MILE OR LESS.
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LOCAL
CLIMATOLOGICAL DATA
Monthly Summary

SKY HARBOR INTL AIRPORT

LATITUDE 33° 26'N   LONGITUDE 112° 01'W   ELEVATION (GROUND) 1110 FEET   TIME ZONE MOUNTAIN   23:53

PHOENIX, AZ.

DATE	TEMPERATURE °F MAXIMUM	MINIMUM	AVERAGE	DEPARTURE FROM NORMAL	AVERAGE DEW POINT	DEGREE DAYS BASE 65°F HEATING (SEASON BEGINS WITH JUL)	COOLING (SEASON BEGINS WITH JAN)	WEATHER TYPES	SNOW ICE PELLETS OR ICE ON GROUND AT 0500 (INCHES)	PRECIPITATION WATER EQUIVALENT (INCHES)	SNOW, ICE PELLETS (INCHES)	AVERAGE STATION PRESSURE IN INCHES ELEV 1107 FEET ABOVE M S L	WIND IN M.P.H. RESULTANT DIR	RESULTANT SPEED	AVERAGE SPEED	PEAK GUST SPEED	PEAK GUST DIRECTION	FASTEST 1-MIN SPEED	FASTEST 1-MIN DIRECTION	SUNSHINE MINUTES	PERCENT OF TOTAL POSSIBLE	SKY COVER (TENTHS) SUNRISE TO SUNSET	SKY COVER (TENTHS) MIDNIGHT TO MIDNIGHT
1	2	3	4	5	6	7A	7B	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	104	79	92	0	61	0	27		0	T	0.0	28.690	14	4.0	9.5	35	SE	24	14	737	95	1	5
02	102	76	39	-1	63	0	24		0	0.00	0.0	28.740	21	0.5	6.8	15	N	12	14	771	93	2	2
03	105	75	90	-2	62	3	0	25	0	0.33	0.0	28.740	24	1.7	6.1	26	W	18	15	790	96	2	2
04	103	79	91	-1	63	0	26		0	0.00	0.0	28.740	12	2.8	4.8	15	NE	12	05	806	98	1	2
05	108	85	97	6	59	0	32	3	0	T	0.0	28.755	10	6.7	8.2	22	SE	13	06	779	95	1	2
06	105	87	96	5	62	0	31	3	0	0.01	0.0	28.800	11	7.0	8.1	22	E	14	07	648	79	3	4
07	102	81	92	1	62	0	27		0	0.00	0.0	28.790	12	5.5	6.6	18	S	12	16	814	100	3	3
08	108	85	97	6	60	0	32		0	0.00	0.0	28.730	12	4.4	6.6	15	S	12	30	817	100	1	1
09	110	86	98	7	57	0	33		0	0.00	0.0	28.710	13	6.0	7.4	20	SE	14	14	815	100	1	1
10	111	88	100	9	55	0	35		0	0.00	0.0	28.720	13	1.1	7.0	16	W	13	25	794	98	1	2
11	105	75	90	-1	56	0	25	3	0	0.38	0.0	28.750	28	5.1	6.7	38	NW	17	32	693	85	3	7
12	98	76	87	-2	64	0	22	3	0	0.05	0.0	28.750	11	2.5	6.6	31	NE	23	06	701	87	3	9
13	94	78	86	-4	64	0	21		0	T	0.0	28.710	09	3.0	6.2	15	E	10	09	523	65	4	9
14	78	71	75	-15	70	0	10		0	1.20	0.0	28.720	10	4.3	5.6	14	E	10	09	11	1	10	10
15	88	70	79	-11	69	0	14	3	0	0.73	0.0	28.740	11	3.5	4.9	15	W	8	11	598	74	3	7
16	97	77	87	-1	68	0	22		0	0.00	0.0	28.720	10	2.3	4.3	10	S	7	12	755	94	2	1
17	100	79	90	2	65	0	25		0	0.00	0.0	28.695	19	0.4	4.2	12	SW	8	30	778	97	1	1
18	103	81	92	2	55	0	27		0	0.00	0.0	28.690	10	4.4	5.8	13	SE	9	13	781	98	1	1
19	102	79	91	2	52	0	26		0	0.00	0.0	28.670	15	4.4	8.2	17	S	14	20	764	96	1	3
20	102	82	92	3	47	0	27		0	0.00	0.0	28.710	14	4.5	7.5	18	S	12	18	748	94	1	2
21	102	76	89	0	49	0	24		0	0.00	0.0	28.780	07	1.9	5.4	12	SW	9	06	794	100	2	0
22	104	77	91	2	50	0	26		0	0.00	0.0	28.710	12	1.1	5.4	13	NW	9	30	792	100	2	0
23	105	77	91	2	49	0	26		0	0.00	0.0	28.620	11	4.1	5.9	15	S	9	16	790	100	1	0
24	106	77	92	3	45	0	27		0	0.00	0.0	28.660	12	3.6	7.3	17	S	12	17	788	100	1	1
25	102	75	89	0	44	0	24		0	0.00	0.0	28.720	15	2.3	5.8	18	E	10	15	796	100	1	1
26	102	77	90	1	48	0	25		0	0.00	0.0	28.770	07	3.0	5.4	13	SE	10	09	767	98	2	2
27	102	82	92	4	55	0	27		0	0.00	0.0	28.810	27	4.1	7.0	16	W	9	12	712	91	2	4
28	105	82	94	6	66	0	29		0	0.00	0.0	28.750	26	3.6	6.6	14	W	12	24	781	100	1	1
29	108	86	97	9	63	0	32		0	0.00	0.0	28.680	25	3.7	5.9	24	SE	16	15	778	100	2	5
30	106	85	96	8	61	0	31		0	T	0.0	28.680	16	2.1	6.1	18	E	13	09	776	100	2	7
31	95	81	89	1	63	0	24		0	T	0.0	28.700	10	5.0	5.9	16	E	12	09	341	44	5	7

| | SUM 3163 | SUM 2464 | | | | TOTAL | TOTAL 806 | NUMBER OF DAYS | | TOTAL 2.70 | TOTAL 0.0 | 28.725 | 13 | 2.2 | FOR THE MONTH: 6.4 | 38 | NW | 24 | 14 | TOTAL 22282 | | 1-SUN 55 | SUN 198 |
| | AVG. 102.0 | AVG. 79.5 | AVG. 90.9 | DEP. 0.9 | AVG. 58.6 | DEP. 0 | DEP. 34 | PRECIPITATION ≥ .01 INCH. 9 | | DEP. 1.68 | | | | | | DATE:11 | | DATE: 1 | | POSSIBLE 24864 | 90 | AVG 3 | AVG 3.6 |

NUMBER OF DAYS		SEASON TO DATE TOTAL	TOTAL	SNOW, ICE PELLETS ≥ 1.0 INCH 0	GREATEST IN 24 HOURS AND DATES		GREATEST DEPTH ON GROUND OF SNOW, ICE PELLETS OR ICE AND DATE
MAXIMUM TEMP. ≥ 90°	MINIMUM TEMP. ≤ 32° ≤ 0°	0	3599	THUNDERSTORMS 6	PRECIPITATION 1.90 14-15	SNOW, ICE PELLETS 0	0
29	0	-0	747	CLEAR 23	PARTLY CLOUDY 4	CLOUDY 4	

≠ EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.
T TRACE AMOUNT.
- ALSO ON EARLIER DATE(S).
HEAVY FOG: VISIBILITY 1/4 MILE OR LESS.
BLANK ENTRIES DENOTE MISSING OR UNREPORTED DATA.

WEATHER TYPES:
1 FOG
2 HEAVY FOG
3 THUNDERSTORM
4 ICE PELLETS
5 HAIL
6 GLAZE
7 DUSTSTORM
8 SMOKE, HAZE
9 BLOWING SNOW

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL ENVIRONMENTAL SATELLITE, DATA AND INFORMATION SERVICE

NATIONAL CLIMATIC DATA CENTER ASHEVILLE NORTH CAROLINA

Kenneth D Hadeen
DIRECTOR
NATIONAL CLIMATIC DATA CENTER

SEP 1990
PHOENIX, AZ
NAT'L WEA SER FCT OFC NOAA
2633 E. BUCKEYE RD

ISSN 0198-0473

SKY HARBOR INTL AIRPORT

LOCAL
CLIMATOLOGICAL DATA
Monthly Summary

LATITUDE 33° 26' N   LONGITUDE 112° 01' W   ELEVATION (GROUND) 1110 FEET   TIME ZONE MOUNTAIN   23493

PHOENIX, AZ   SEP 1990

DATE	TEMPERATURE °F					DEGREE DAYS BASE 65°F		WEATHER TYPES	SNOW ICE PELLETS	PRECIPITATION		AVERAGE STATION PRESSURE	WIND (M.P.H.)							SUNSHINE		SKY COVER	
	MAXIMUM	MINIMUM	AVERAGE	DEPARTURE FROM NORMAL	AVERAGE DEW POINT	HEATING (SEASON BEGINS WITH JUL) 7A	COOLING (SEASON BEGINS WITH JAN) 7B	8	9	WATER EQUIVALENT (INCHES) 10	SNOW, ICE PELLETS (INCHES) 11	12	RESULTANT DIR. 13	RESULTANT SPEED 14	AVERAGE SPEED 15	PEAK GUST SPEED 16	PEAK GUST DIRECTION 17	FASTEST 1-MIN SPEED 18	FASTEST 1-MIN DIRECTION 19	MINUTES 20	PERCENT OF TOTAL POSSIBLE 21	SUNRISE TO SUNSET 22	MIDNIGHT TO MIDNIGHT 23
1	2	3	4	5	6	7A	7B	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	96	83	90	2	65	0	25		0	T	0.0	28.720	08	4.7	6.3	15	E	13	09	272	35	7	7
02	102	74	88	0	63	0	23		0	0.22	0.0	28.720	20	1.3	4.3	16	SE	9	30	144	19		
03	104	75	90	3	69	0	25	3	0	0.03	0.0	28.710	13	1.6	8.0	37	NE	23	05	459	77		
04	100	76	88	1	56	0	23		0	0.00	0.0	28.770	25	2.6	5.0	18	W	13	27	604	79	5	5
05	94	74	84	-3	70	0	19	3	0	0.06	0.0	28.820	27	4.5	6.5	13	NW	10	24	555	73	5	
06	100	79	90	3	68	0	25		0	0.00	0.0	28.780	28	2.7	5.0	14	NW	9	25	743	100	3	
07	105	83	94	7	63	0	29		0	0.00	0.0	28.700	24	3.5	3.5	12	W	8	25	741	100		
08	109	84	96	9	63	0	31		0	0.00	0.0	28.660	14	1.1	4.4	12	SW	9	23	758	100		
09	110	86	98	12	63	0	33		0	0.00	0.0	28.640	13	1.4	5.4	10	W	8	26	757	100	3	
10	111	84	98	12	67	0	33		0	0.00	0.0	28.630	26	1.5	3.8	9	W	7	26	755	100		
11	112*	85	99*	13	56	0	34		0	0.00	0.0	28.630	22	1.2	4.4	10	W	8	26	715	95		
12	105	83	94	8	61	0	29		0	0.00	0.0	28.650	24	2.1	5.1	13	W	12	26	751	100		
13	105	83	94	8	63	0	29		0	0.30	0.0	28.640	26	2.0	4.0	10	W	9	25	749	100	3	
14	100	70	85	0	66	0	20	3	0	0.30	0.0	28.710	24	3.0	7.8	48	NE	35	05	674	90	3	4
15	88	69	79	-6	68	0	14	3	0	0.06	0.0	28.720	36	0.8	4.5	16	NW	8	36	435	58	3	8
16	95	73	84	-1	65	0	19		0	0.00	0.0	28.620	15	1.9	4.3	12	W	7	08	711	96		
17	98	77	88	3	62	0	23		0	0.00	0.0	28.650	11	4.3	5.7	18	SE	14	14	570	80	5	
18	98	77	88	4	62	0	23		0	0.00	0.0	28.670	10	5.1	6.8	15	E	12	10	428	58	5	
19	97	72	85	1	55	0	20		0	0.00	0.0	28.630	10	3.6	6.9	12	W	10	10	736	100	1	
20	93	67*	80	-4	61	0	15	3	0	0.14	0.0	28.630	06	2.1	5.5	32	SW	13	23	540	74	5	
21	95	72	84	1	63	0	19		0	T	0.0	28.750	14	1.6	4.8	16	W	12	25	651	90		
22	95	71	83	0	62	0	18		0	0.00	0.0	28.810	12	1.3	3.5	14	SE	8	15	605	83	5	
23	97	77	87	4	63	0	22		0	0.00	0.0	28.800	10	6.5	6.8	17	E	14	11	648	89	5	
24	95	76	86	4	60	0	21		0	0.00	0.0	28.785	09	4.5	5.6	14	E	12	07	714	99	3	
25	100	76	88	6	57	0	23		0	0.00	0.0	28.770	17	1.4	3.7	12	SE	7	11	680	94	3	
26	99	75	87	5	51	0	22		0	0.00	0.0	28.730	12	1.0	3.6	10	S	7	09	692	96	5	5
27	99	72	86	5	48	0	21		0	0.00	0.0	28.635	19	1.5	4.6	12	W	9	27	720	100		
28	94	71	83	2	48	0	18		0	0.00	0.0	28.585	11	1.9	5.8	12	W	9	28	718	100	0	
29	93	69	81	0	43	0	16		0	0.00	0.0	28.585	11	3.0	4.0	14	SW	8	09	677	95	3	2
30	82	70	76*	-4	51	0	11		0	0.00	0.0	28.790	10	6.5	7.4	24	NE	17	06	197	28	5	

	SUM	SUM				TOTAL	TOTAL			TOTAL	TOTAL	FOR THE MONTH:								TOTAL	%	SUM	SUM
	2971	2282				0	683			1.11	0.0	28.700	13	1.2	5.2	48	NE	35	05	19169	100	112	99
	AVG.	AVG	AVG	DEP.	AVG.	DEP.	DEP.	PRECIPITATION		DEP.						DATE:14		DATE:14				AVG	AVG
	99.0	76.1	87.6	3.0	60.9	0	95	≥ .01 INCH	6	0.47										22284	95	3	3

NUMBER OF DAYS

	SEASON TO DATE		SNOW, ICE PELLETS	GREATEST IN 24 HOURS AND DATES		GREATEST DEPTH ON GROUND OF	
	TOTAL	TOTAL	≥ 1.0 INCH	PRECIPITATION	SNOW, ICE PELLETS	SNOW, ICE PELLETS OR ICE AND DATE	
	0	4282	THUNDERSTORMS 5	0.44 20	0.0	0	

NUMBER OF DAYS

MAXIMUM TEMP		MINIMUM TEMP		HEAVY FOG 0			
≥ 90°	≤ 32°	≤ 32°	≤ 0°	CLEAR 16	PARTLY CLOUDY 12	CLOUDY 2	
29	0	0	0				

* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.
T TRACE AMOUNT.
+ ALSO ON EARLIER DATE(S).
HEAVY FOG: VISIBILITY 1/4 MILE OR LESS.
BLANK ENTRIES DENOTE MISSING OR UNREPORTED DATA.

TORNADO OBSERVED DAY 3.

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I CERTIFY THAT THIS IS AN OFFICIAL PUBLICATION OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, AND IS COMPILED FROM RECORDS ON FILE AT THE NATIONAL CLIMATIC DATA CENTER

Kenneth D Hadeen

DIRECTOR
NATIONAL CLIMATIC DATA CENTER

1989 LOCAL CLIMATOLOGICAL DATA
ANNUAL SUMMARY WITH COMPARATIVE DATA
PHOENIX, ARIZONA
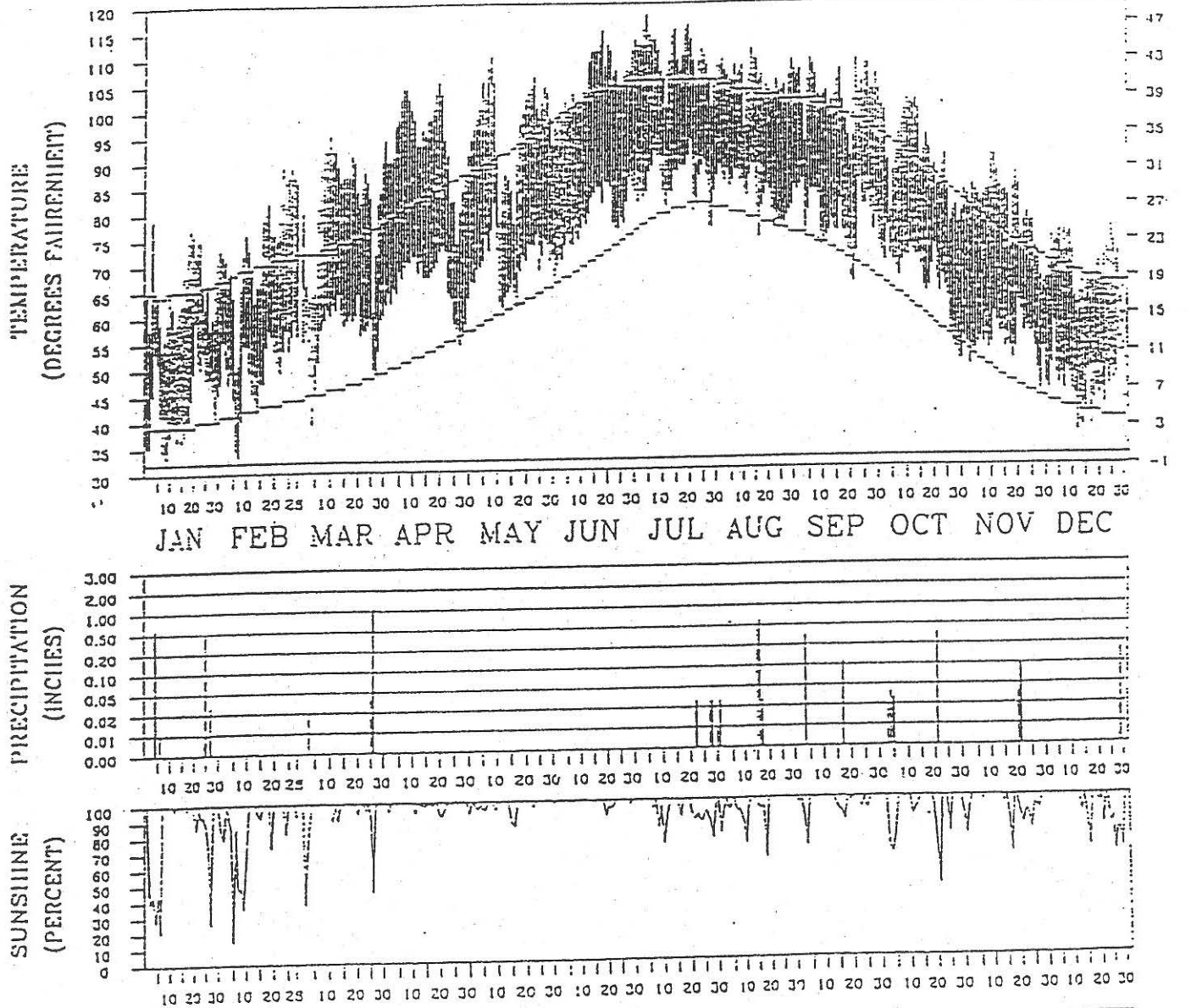
RECEIVED

Daily Data

MAY 2 3 1990

CELSIUS

TEMPERATURE (DEGREES FAHRENHEIT)

120 — 47
115 — 43
110
105 — 39
100 — 35
95
90 — 31
85
80 — 27
75
70 — 23
65
60 — 19
55
50 — 15
45
40 — 11
35 — 7
30 — 3
— -1

10 20 30 10 20 25 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

PRECIPITATION (INCHES)

3.00
2.00
1.00
0.50
0.20
0.10
0.05
0.02
0.01
0.00

10 20 30 10 20 25 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30

SUNSHINE (PERCENT)

100
90
80
70
60
50
40
30
20
10
0

10 20 30 10 20 25 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30 10 20 30

TEMPERATURE DEPICTS NORMAL MAXIMUM, NORMAL MINIMUM AND ACTUAL DAILY HIGH AND LOW VALUES (FAHRENHEIT)
PRECIPITATION IS MEASURED IN INCHES. SCALE IS NON-LINEAR
SUNSHINE IS PERCENT OF THE POSSIBLE SUNSHINE

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RECORDS ON FILE AT THE NATIONAL CLIMATIC DATA CENTER, ASHEVILLE, NORTH CAROLINA, 28801

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NATIONAL
CLIMATIC DATA CENTER
ASHEVILLE NORTH CAROLINA

DIRECTOR
NATIONAL CLIMATIC DATA CENTER

JANUARY 2002
LOCAL CLIMATOLOGICAL DATA
NOAA, National Climatic Data Center

PHOENIX, AZ

SKY HARBOR INTL AIRPORT (PHX)

Lat: 33°26' N   Long:111°59' W   Elev (Ground): 1103 Feet

Time Zone: MOUNTAIN   WBAN: 23183 ISSN #:0198−0475

	TEMPERATURE °F						DEG DAYS BASE 65°		WEATHER	SNOW/ICE ON GND(IN)				PRESSURE (INCHES OF HG)		WIND SPEED = MPH DIR = TENS OF DEGREES							
										0500 LST	1100 LST	2400 LST	2400 LST						MAXIMUM				
																			5−SEC		2−MIN		
DATE	MAXIMUM	MINIMUM	AVERAGE	DEP FROM NORMAL	AVERAGE DEW PT	AVERAGE WET BULB	HEATING	COOLING		DEPTH	WATER EQUIV	SNOW-FALL	WATER EQUIV	AVERAGE STATION	AVERAGE SEA LEVEL	RESULTANT SPEED	RES DIR	AVERAGE SPEED	SPEED	DIR	SPEED	DIR	DATE
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
01	67	44	56	3	38	47	9	0					0.00	28.91	30.08	1.8	10	4.1	16	05	14	06	01
02	65	50	58	5	29	45	7	0					0.00	28.95	30.11	9.4	07	9.6	22	06	18	06	02
03	66	47	57	4	32	46	8	0					0.00	28.89	30.05	1.6	07	4.7	17	08	15	08	03
04	67	44	56	3	35	46	9	0					0.00	28.94	30.10	1.4	24	5.2	17	26	15	26	04
05	65	41	53	0	26	42	12	0					0.00	29.14	30.32	0.8	22	3.1	15	07	10	06	05
06	67	41	54	1	25	41	11	0					0.00	29.12	30.29	1.0	12	3.2	9	30	9	10	06
07	72	44	58	5	32	45	7	0					0.00	29.06	30.23	2.1	09	3.4	9	30	9	08	07
08	81*	47	64	11	37	50	1	0					0.00	28.90	30.05	2.1	10	2.7	10	09	9	08	08
09	72	53	63	10	38	50	2	0					0.00	28.79	29.94	3.8	11	5.5	13	14	10	10	09
10	74	55	65*	12	40	51	0	0	RA				T	28.85	30.00	1.6	06	6.1	37*	05	31*	05	10
11	76	50	63	10	32	48	2	0					0.00	29.03	30.19	4.3	06	6.3	23	05	20	05	11
12	74	47	61	8	32	47	4	0					0.00	28.98	30.14	2.1	11	3.2	13	12	13	07	12
13	71	44	58	5	31	45	7	0					0.00	28.78	29.94	2.9	10	4.6	12	10	9	09	13
14	73	45	59	5	29	45	6	0					0.00	28.76	29.92	3.6	11	5.1	14	08	13	09	14
15	69	49	59	5	31	45	6	0					0.00	28.74	29.90	3.7	09	5.3	13	08	12	08	15
16	64	53	59	5	42	50	6	0					0.00	28.82	29.98	1.5	28	4.6	18	30	16	31	16
17	62	45	54	0	29	42	11	0					0.00	28.91	30.07	2.1	25	3.5	10	01	8	22	17
18	63	39	51	−3	25	40	14	0	HZ				0.00	28.95	30.12	1.7	14	4.3	15	27	13	28	18
19	62	39	51	−3	16	37	14	0					0.00	28.90	30.07	2.4	09	3.5	16	08	15	07	19
20	61	36	49	−5	17	37	16	0					0.00	28.90	30.08	0.9	10	3.4	10	32	8	26	20
21	67	38	53	−1	18	38	12	0					0.00	28.86	30.03	2.2	10	4.7	14	09	14	09	21
22	67	40	54	−1	21	40	11	0					0.00	28.73	29.90	3.3	09	5.8	16	10	14	09	22
23	61	49	55	−1	22	41	10	0					0.00	28.79	29.95	5.5	27	9.1	24	28	21	26	23
24	64	38	51	−5	9	36	14	0					0.00	29.10	30.28	2.3	35	5.9	20	02	16	07	24
25	72	41	57	1	17	41	8	0					0.00	28.99	30.16	4.9	09	5.8	23	07	21	06	25
26	75	43	59	3	24	44	6	0					0.00	28.83	29.98	3.8	11	4.7	13	17	10	18	26
27	68	47	58	2	31	46	7	0					0.00	28.77	29.92	3.1	09	4.5	16	36	12	09	27
28	65	52	59	3	32	46	6	0					0.00	28.76	29.91	0.4	28	5.3	18	29	16	29	28
29	60	50	55	−1	28	43	10	0					0.00	28.74	29.90	5.0	27	6.2	18	27	16	27	29
30	54	42	48	−8	31	40	17	0	TSRA RA				0.05	28.79	29.96	6.5	29	9.2	25	29	22	28	30
31	55	36*	46*	−10	26	38	19	0					0.00	29.08	30.27	2.4	09	4.3	16	09	12	09	31
	67.1	44.8	56.0	▪▪	28.2	43.6	8.8	0.0	< MONTHLY AVERAGES TOTALS−>				0.05	28.90	30.06	1.3	09	5.1	<− MONTHLY AVERAGES				
	2.1	1.4	1.8	▪▪	<−−−−−−−−−−−−−DEPARTURE FROM NORMAL −−−−−−−−−−−−−>									−.78	SUNSHINE, CLOUD, & VISIBILITY TABLES ON PAGE 3								

DEGREE DAYS								
	MONTHLY		SEASON TO DATE		GREATEST 24−HR PRECIPITATION: 0.05 DATE :30		SEA LEVEL PRESSURE DATE TIME	
	TOTAL	DEPARTURE	TOTAL	DEPARTURE	GREATEST 24−HR SNOWFALL: DATE :		MAXIMUM : 30.40 05 0956	
					GREATEST SNOW DEPTH: DATE :		MINIMUM : 29.82 22 1656	
HEATING:	272	−32	681	−56	NUMBER OF DAYS WITH →	MAXIMUM TEMP ≥ 90: 0 / MAXIMUM TEMP ≤ 32: 0 / THUNDERSTORMS : 1	MINIMUM TEMP ≤ 32: 0 / MINIMUM TEMP ≤ 0 : 0 / HEAVY FOG : 0	PRECIPITATION ≥ 0.01 INCH : 1 / PRECIPITATION ≥ 0.10 INCH : 0 / SNOWFALL ≥ 1.0 INCH :
COOLING:	0	−2	0	−2				

Appendix 5.5

VMT Reasonableness Calculations

Vehicle miles traveled (VMT) per gallon of gasoline consumed was calculated to check the reasonableness of the VMT numbers used in compiling the onroad portion of the 2002 Periodic Inventory. The following calculations were made to arrive at the VMT per gallon of gasoline consumed in the Maricopa County nonattainment area in 2002. The answer of 18.16 miles per gallon (mpg) falls within the acceptable range listed in the Appendix B Level II Quality Review Checklist of the <u>Quality Review Guidelines for 1990 Base Year Emission Inventories</u>, July 1992 of 14.6 and 24.4 mpg.

The Arizona Department of Transportation estimated that 1.459×10^9 gallons of gasoline were sold in Maricopa County in 2002. Annual Average Daily VMT (AADVMT) of the county is previously estimated in this report as 73.579×10^6 VMT (See Table 5-1(b), page 6).

Annual VMT = AADVMT $\times$ 365 days/year = 265.11×10^8 VMT.

VMT per gallon of gasoline consumed = 26.511×10^9 VMT / 1.459×10^9 gallons of gasoline = 18.40 miles per gallon.

The estimate miles per gallon consumed in the 1999 periodic inventory was 15.84 miles per gallon. Both estimates are well within the acceptable range listed in the quality review checklist.

Appendix 5.6

FORTRAN Source Code for Emission Factor Weighting Program

```
      Program NEIProgram
* This program reads in the monthly MOBILE6 output files, both I/M
* and non-I/M and averages all of the results together into
* an annual average set of emission factors.
*
* There will be 24 runs, two for each month.
*
      character*15 filename(12,2)
      character*130 line1
      character*3 month(12),IM(2),poll(3),scen(16)
      real*8 ef(12,2,3,16,10),efmerg(3,16,10)

      data ef / 11520*0.0 /
      data efmerg / 480*0.0 /

      data filename /'IMJAN02.TXT',
     +          'IMFEB02.TXT',
     +          'IMMAR02.TXT',
     +          'IMAPR02.TXT',
     +          'IMMAY02.TXT',
     +          'IMJUN02.TXT',
     +          'IMJUL02.TXT',
     +          'IMAUG02.TXT',
     +          'IMSEP02.TXT',
     +          'IMOCT02.TXT',
     +          'IMNOV02.TXT',
     +          'IMDEC02.TXT',
     +          'NIMJAN02.TXT',
     +          'NIMFEB02.TXT',
     +          'NIMMAR02.TXT',
     +          'NIMAPR02.TXT',
     +          'NIMMAY02.TXT',
     +          'NIMJUN02.TXT',
     +          'NIMJUL02.TXT',
     +          'NIMAUG02.TXT',
     +          'NIMSEP02.TXT',
     +          'NIMOCT02.TXT',
     +          'NIMNOV02.TXT',
     +          'NIMDEC02.TXT' /
      data month /'Jan','Feb','Mar','Apr','May','Jun',
     +          'Jul','Aug','Sep','Oct','Nov','Dec'/
      data IM /'IM ','NIM'/
      data poll /'VOC','CO ','NOx'/
      data scen /'F-1','F-2','F-3','F-4','F-5',
     +          'A-1','A-2','A-3','A-4','A-5',
     +          'C-1','C-2','C-3','C-4','C-5','L-A'/

      ipoll=0
      iscen=1
      do 100 i12=1,12
       do 110 i2=1,2
  open(unit=20,file=filename(i12,i2),status='old')
         do 120 i10000=1,10000
          read(20,99,end=121) line1
          if(line1(6:14).eq.'Composite') then
c          write(*,*) line1
           ipoll=ipoll+1
```

```
      if(ipoll.gt.3) then
    ipoll=1
        iscen=iscen+1
        endif
        if(iscen.gt.16) iscen=1
        read(line1,97,err=120)
  +      ef(i12,i2,ipoll,iscen,1),
  +      ef(i12,i2,ipoll,iscen,2),
  +      ef(i12,i2,ipoll,iscen,3),
  +      ef(i12,i2,ipoll,iscen,4),
  +      ef(i12,i2,ipoll,iscen,5),
  +      ef(i12,i2,ipoll,iscen,6),
  +      ef(i12,i2,ipoll,iscen,7),
  +      ef(i12,i2,ipoll,iscen,8),
  +      ef(i12,i2,ipoll,iscen,9),
  +      ef(i12,i2,ipoll,iscen,10)
      endif
120    continue
121    close(20)
110    continue
100  continue
     do 210 it3=1,3
      do 220 it4=1,16
      do 230 it5=1,10
      efmerg(it3,it4,it5) =  (
  +   ef(1,1,it3,it4,it5)*0.98*31./365.*.917 +
  +   ef(2,1,it3,it4,it5)*1.03*28./365.*.917 +
  +   ef(3,1,it3,it4,it5)*1.03*31./365.*.917 +
  +   ef(4,1,it3,it4,it5)*1.03*30./365.*.917 +
  +   ef(5,1,it3,it4,it5)*0.99*31./365.*.917 +
  +   ef(6,1,it3,it4,it5)*0.98*30./365.*.917 +
  +   ef(7,1,it3,it4,it5)*0.94*31./365.*.917 +
  +   ef(8,1,it3,it4,it5)*0.96*31./365.*.917 +
  +   ef(9,1,it3,it4,it5)*0.99*30./365.*.917 +
  +   ef(10,1,it3,it4,it5)*1.02*31./365.*.917 +
  +   ef(11,1,it3,it4,it5)*1.02*30./365.*.917 +
  +   ef(12,1,it3,it4,it5)*1.04*31./365.*.917 +
  +   ef(1,1,it3,it4,it5)*0.98*31./365.*.083 +
  +   ef(2,1,it3,it4,it5)*1.03*28./365.*.083 +
  +   ef(3,1,it3,it4,it5)*1.03*31./365.*.083 +
  +   ef(4,1,it3,it4,it5)*1.03*30./365.*.083 +
  +   ef(5,1,it3,it4,it5)*0.99*31./365.*.083 +
  +   ef(6,1,it3,it4,it5)*0.98*30./365.*.083 +
  +   ef(7,1,it3,it4,it5)*0.94*31./365.*.083 +
  +   ef(8,1,it3,it4,it5)*0.96*31./365.*.083 +
  +   ef(9,1,it3,it4,it5)*0.99*30./365.*.083 +
  +   ef(10,1,it3,it4,it5)*1.02*31./365.*.083 +
  +   ef(11,1,it3,it4,it5)*1.02*30./365.*.083 +
  +   ef(12,1,it3,it4,it5)*1.04*31./365.*.083)

230    continue
220    continue
210    continue
     do 300 iscen=1,16
      write(*,*) ' '
      do 310 ipoll=1,3
        write(*,96) (efmerg(ipoll,iscen,it5),it5=1,10)
```

```
      +           , poll(ipoll), scen(iscen)
310    continue
300    continue
97    format(20x,f11.0,4(f10.0),f9.0,4(f10.0))
98    format(f11.4,4(f10.4),f9.4,4(f10.4),4(a5))
96    format(f11.4,4(f10.4),f9.4,4(f10.4),2(a5))
99    format(a130)
      stop
      end
```

Appendix 5.7

Monthly Gasoline Data

Gasoline quality data for each month of the year was obtained from the Arizona Department of Weights and Measures. The fuel quality for each month is shown below. Oxygenate data for the months January through March were not provided, so the similar carbon monoxide season months November and December were averaged and this oxygenate settings were used for January through March.

Month	RVP	Sulfur content	MTBE Market Share	Ethanol Market Share	MTBE % Weight	Ethanol % Weight
January	9.0	26.2	0%	100%	0	3.1
February	8.9	33.9	0%	100%	0	3.1
March	8.9	39.6	0%	100%	0	3.1
April	7.5	50.2	100%	0%	1.5	0
May	7.0	42.1	100%	0%	1.7	0
June	6.6	69.1	100%	0%	1.8	0
July	6.6	88.9	100%	0%	1.8	0
August	6.5	71.5	100%	0%	1.9	0
September	6.6	67.3	100%	0%	2.0	0
October	8.0	64.3	40%	60%	1.4	3.2
November	8.4	48.9	0%	100%	0	3.0
December	8.7	42.0	0%	100%	0	3.2
Annual Average*	7.8	52.5	50%	50%	1.9	3.1

* Note that the annual average may not equal the average of the twelve constituent months because the annual average weights were calculated as the average of the 793 gasoline samples collected in 2002 rather than an averaging of the average values for each of the twelve months. Additionally, the MTBE % by weight reflects the percent by weight in samples with MTBE present. Similarly, the ethanol percent by weight reflects the percent by weight in samples with ethanol present. As an example, the fuel samples for November and December would not effect the MTBE percent by weight because the fuel samples for that month did not include MTBE. The MTBE percent by weight only reflects the averages of the samples that contained MTBE.